STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

STANDARD LOW BID PROJECT – INVITATIONAL
Project Budgets $50,000 - $100,000

July 17, 2007

WAREHOUSE PAVING IMPROVEMENTS

DEPARTMENT OF ALCOHOLIC BEVERAGE CONTROL

SALT LAKE CITY, UTAH

DFCM Project Number: 07086030

Nolte Associates, Inc.
5717 South State Street #300
Salt Lake City, Utah 84107

TABLE OF CONTENTS

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM.

DFCM General Conditions dated May 25, 2005.
DFCM Application and Certification for Payment dated May 25, 2005.

Technical Specifications :
Drawings:

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

INVITATION TO BID

Only firms that have been invited to submit bids on this project are allowed to bid on this project.

Sealed bids will be received by the Division of Facilities Construction and Management (DFCM) for:

WAREHOUSE PAVING IMPROVEMENTS
DEPARTMENT OF ALCHOLIC BEVERAGE CONTROL
SALT LAKE CITY, UTAH
DFCM PROJECT NO: _07086030

Company	Contact	Fax
DRD Paving & Concrete	Dave Harrison	801-288-1001
Kilgore Paving & Maintenance	Jason Kilgore	801-364-2722
Mogan Paving	Brian Allen	801-416-8061
Preferred Paving	Bill Panunzio	801-908-6622
Miller Paving, Inc.	Frank Burns	801-262-3254
Geneva Rock Products, Inc.	Albert Schellenberg	801-281-7939
Staker & Parsons Companies	Brad Hansen	801-409-2687

Bids will be in accordance with the Contract Documents that will be available on July 17, 2007, and distributed in electronic format only on CDs from DFCM, 4110 State Office Building, SLC, Utah and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Brent Lloyd, DFCM, at 801-538-3471. No others are to be contacted regarding this bidding process. The construction budget for this project is $70,000.00.

A **mandatory** pre-bid meeting will be held at the Alcholic Beverage Control Warehouse, located on 1625 South 900 West in Salt Lake City, Utah on Friday, July 20, 2007 at 10:00 AM. All bidders wishing to bid on this project are required to attend this meeting.

Bids will be received until the hour of 2:45 PM on August 1, 2007 at DFCM, 4ll0 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. NOTE: Bids must be received at 4110 State Office Building by the specified time.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction and Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of DFCM.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
Joanna Fisher, Contract Coordinator
4110 State Office Building, Salt Lake City, Utah 84114

PROJECT DESCRIPTION

The Base Bid for this project consists of removal of approximately 6,600 square feet of existing asphalt paving in the dock area of the Alcholic Beverage Control (ABC) Warehouse and replacing it with concrete paving per plans and Specifications. Also included in the Base Bid is the replacement of the concrete waterway at the entrance to the dock area.

As Alternate #1 to the Base Bid, the contractor shall submit a per square foot price for additional paving in the area labeled Alternate #1 on the plans. This additional work will be done as budget allows.

The challenge in this project is that the ABC Warehouse is in operation 24 hours a day, 7 days a week. The contractor will be expected to adjust his work schedule to best accommodate the warehouse operation.

PROJECT SCHEDULE

PROJECT NAME: Warehouse Paving Improvements - Department of Alcholic Beverage Control
Salt Lake City, Utah
DFCM PROJECT NO. 07086030

Event	Day	Date	Time	Place
Bidding Documents Available	Tuesday	July 17, 2007	3:00 PM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Mandatory Pre-bid Site Meeting	Friday	July 20, 2007	10:00 AM	Alchlolic Beverage Control Warehouse, 1625 South 900 West, Salt Lake City, Utah at the dock area
Last Day to Submit Questions	Monday	July 23, 2007	4:00 PM	In writing to: brentlloyd@utah.gov
Addendum Deadline (exception for bid delays)	Wednesday	July 25, 2007	4:00 PM	DFCM Website: **http://dfcm.utah.gov**
Prime Contractors Turn In Bid and Bid Bond	Wednesday	August 1, 2007	2:45 PM	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Sub-contractor List Due	Thursday	August 2, 2007	2:45 PM	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Substantial Completion Date	Friday	October 12, 2007	4:00 PM	

* **NOTE: DFCM's web site address is http://dfcm.utah.gov**

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Instructions to Bidders", in compliance with your invitation for bids for the Warehouse Paving Improvements Department of Alcholic Beverage Control – Salt Lake City, Utah – Project No. 07086030 and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

Base Bid: For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

Alternate #1: For all work shown on the Drawings and described in the Specifications and Contract Documents as Alternate #1, I/we agree to perform the sum of:

_____ / Per Square Foot DOLLARS ($_____ / S. F.)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by October 12 2007, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$500.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract.

The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization:

_____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

INSTRUCTIONS TO BIDDERS

1. Drawings and Specifications, Other Contract Documents

Drawings and Specifications, as well as other available Contract Documents, may be obtained as stated in the Invitation to Bid.

2. Bids

Before submitting a bid, each contractor shall carefully examine the Contract Documents, shall visit the site of the Work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the Contract Documents. If the bidder observes that portions of the Contract Documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Representative and the necessary changes shall be accomplished by Addendum.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the deadline for submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a bid bond form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **NOTE: A cashier's check cannot be used as a substitute for a bid bond.**

3. Contract and Bond

The Contractor's Agreement will be in the form found in the specifications. The Contract Time will be as indicated in the bid. The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents. The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the contract sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for subcontractors will be specified in the Supplementary General Conditions.

4. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", which are included as part of these Contract Documents. The Subcontractors List shall be delivered to DFCM or faxed to DFCM at (801)538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the Contract Documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements is subject to a debarment hearing and may be debarred from consideration for award of contracts for a period of up to three years.

5. Interpretation of Drawings and Specifications

If any person or entity contemplating submitting a bid is in doubt as to the meaning of any part of the drawings, specifications or other Contract Documents, such person shall submit to the DFCM Project Manager a request for an interpretation thereof. The person or entity submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addenda posted on DFCM's web site at http://dfcm.utah.gov. Neither the DFCM nor A/E will be responsible for any other explanations or interpretations of the proposed documents. A/E shall be deemed to refer to the architect or engineer hired by DFCM as the A/E or Consultant for the Project.

6. Addenda

Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

7. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of the State of Utah to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc.

8. DFCM Contractor Performance Rating

As a contractor completes each DFCM project, DFCM, the architect/engineer and the using agency will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project will not affect this project but may affect the award on future projects.

9. Licensure

The Contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

10. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

11. Time is of the Essence

Time is of the essence in regard to all the requirements of the Contract Documents.

12. Withdrawal of Bids

Bids may be withdrawn on written request received from bidder prior to the time fixed for opening. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened.

13. Product Approvals

Where reference is made to one or more proprietary products in the Contract Documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the Contract Documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the A/E. Such written approval must occur prior to the deadline established for the last scheduled addenda to be issued. The A/E's written approval will be in an issued addendum. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the A/E.

14. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the contractor, subcontractor or sub-subcontractor.

15. Debarment

By submitting a bid, the Contractor certifies that neither it nor its principals, including project and site managers, have been, or are under consideration for, debarment or suspension, or any action that would exclude such from participation in a construction contract by any governmental department or agency. If the Contractor cannot certify this statement, attach to the bid a detailed written explanation which must be reviewed and approved by DFCM as part of the requirements for award of the Project.

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

By: _____

Attorney-in-Fact (Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTIONS AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, on the following basis:

PROJECTS UNDER $500,000 - ALL SUBS $20,000 OR OVER MUST BE LISTED
PROJECTS $500,000 OR MORE - ALL SUBS $35,000 OR OVER MUST BE LISTED

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- Bidder must list "Self" if performing work itself.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

BIDDER LISTING 'SELF' AS PERFORMING THE WORK:

Any bidder that is properly licensed for the particular work and intends to perform that work itself in lieu of a subcontractor that would otherwise be required to be on the subcontractor list, must insert the term 'Self' for that category on the subcontractor list form. Any listing of 'Self' on the sublist form shall also include the amount allocated for that work.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self"	300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: 350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

SUBCONTRACTORS LIST

FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

1. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR DFCMS REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY DFCM. ATTACH A SECOND PAGE IF NECESSARY.

FUGITIVE DUST PLAN

The Contractor will fill out the form and file the original with the Division of Air Quality and a copy of the form with the Division of Facilities Construction & Management, prior to the issuance of any notice to proceed.

The Contractor will be fully responsible for compliance with the Fugitive Dust Control Plan, including the adequacy of the plan, any damages, fines, liability, and penalty or other action that results from noncompliance.

Utah Division of Air Quality
April 20, 1999

GUIDANCE THAT MUST BE CONSIDERED IN DEVELOPING AND SUBMITTING A DUST CONTROL PLAN FOR COMPLIANCE WITH R307-309-3, 4, 5, 6, 7

Source Information:

1. Name of your operation (source): provide a name if the source is a construction site.

2. Address or location of your operation or construction site.

3. UTM coordinates or Longitude/Latitude of stationary emission points at your operation.

4. Lengths of the project, if temporary (time period).

5. Description of process (include all sources of dust and fugitive dust). Please, if necessary, use additional sheets of paper for this description. Be sure to mark it as an attachment.

6. Type of material processed or disturbed.

7. Amount of material processed (tons per year, tons per month, lbs./hr., and applicable units).

8. Destination of product (where will the material produced be used or transported, be specific, provide address or specific location), information needed for temporary relocation applicants.

9. Identify the individual who is responsible for the implementation and maintenance of fugitive dust control measures. List name(s), position(s) and telephone number(s).

10. List, and attach copies of any contract lease, liability agreement with other companies that may, or will, be responsible for dust control on site or on the project.

Description of Fugitive Dust Emission Activities
(Things to consider in addressing fugitive dust control strategies.)

1. Type of activities (drilling and blasting, road construction, development construction, earth moving and excavation, handling and hauling materials, cleaning and leveling, etc).

2. List type of equipment generating the fugitive dust.

3. Diagram the location of each activity or piece of equipment on site. Please attach the diagram.

4. Provide pictures or drawings of each activity. Include a drawing of the unpaved/paved road network used to move loads "on" and "off" property.

5. Vehicle miles travels on unpaved roads associated with the activity (average speed).

6. Type of dust emitted at each source (coal, cement, sand, soil, clay, dust, etc.)

7. Estimate the size of the release area at which the activity occurs (square miles). For haul or dirt roads include total miles of road in use during the activity.

Description of Fugitive Dust Emission Controls on Site

Control strategies must be designed to meet 20% opacity or less on site (a lesser opacity may be defined by Approval Order conditions or federal requirements such as NSPS), and control strategies must prevent exceeding 10% opacity from fugitive dust at the property boundary (site boundary) for compliance with R307-309-3.

1. Types of ongoing emission controls proposed for each activity, each piece of equipment, and haul roads.

2. Types of additional dust controls proposed for bare, exposed surfaces (chemical stabilization, synthetic cover, wind breaks, vegetative cover, etc).

3. Method of application of dust suppressant.

4. Frequency of application of dust suppressant.

5. Explain what triggers the use of a special control measure other than routine measures already in place, such as covered loads or measures covered by a permit condition (increase in opacity, high winds, citizen complaints, dry conditions, etc).

6. Explain in detail what control strategies/measures will be implemented off-hours, i.e., Saturdays/Sundays/Holidays, as well as 6 PM to 6 AM each day.

Description of Fugitive Dust Control Off-site

Prevent, to the maximum extent possible, deposition of materials, which may create fugitive dust on public and private paved roads in compliance with R307-309-5, 6, 7.

1. Types of emission controls initiated by your operation that are in place "off" property (application of water, covered loads, sweeping roads, vehicle cleaning, etc.).

2. Proposed remedial controls that will be initiated promptly if materials, which may create fugitive dust, are deposited on public and private paved roads.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Fugitive Dust Control Plan Violation Report

When a source is found in violation of R307-309-3 or in violation of the Fugitive Dust Control Plan, the course must submit a report to the Executive Secretary within 15 days after receiving a Notice of Violation. The report must include the following information:

1. Name and address of dust source.

2. Time and duration of dust episode.

3. Meteorological conditions during the dust episode.

4. Total number and type of fugitive dust activities and dust producing equipment within each operation boundary. If no change has occurred from the existing dust control plan, the source should state that the activity/equipment is the same.

5. Fugitive dust activities or dust producing equipment that caused a violation of R-307-309-3 or the sources dust control plan.

6. Reasons for failing to control dust from the dust generating activity or equipment.

7. New and/or additional fugitive dust control strategies necessary to achieve compliance with R307-309-3, 4, 5, 6, or 7.

8. If it can not be demonstrated that the current approved Dust Control Plan can result in compliance with R307-309-3 through 7, the Dust Control Plan must be revised so as to demonstrate compliance with 307-309-3 through 7. Within 30 days of receiving a fugitive dust Notice of Violation, the source must submit the revised Plan to the Executive Secretary for review and approval.

Submit the Dust Control Plan to:

Executive Secretary
Utah Air Quality Board
POB 144820
15 North 1950 West
Salt Lake City, Utah 84114-4820

Phone: (801) 536-4000
FAX: (801) 536-4099

Attachments: DFCM Form FDR R-307-309, Rule 307-309

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100% Performance Bond and a 100%

Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete by _____. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Invitation to Bid, Instructions to Bidders/ Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to

safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
David D. Williams, Jr. Date
DFCM Administrative Services Director

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
_____- Manager Date
Capital Development/Improvements

APPROVED AS TO FORM:
ATTORNEY GENERAL
November 30, 2006
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)

) ss.

COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

DFCM FORM 1b 113006

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

DFCM FORM 1b 113006

CHANGE ORDER #_____

CONTRACTOR:

ARCHITECT:

AGENCY OR INSTITUTION:
PROJECT NAME:
PROJECT NUMBER:
CONTRACT NUMBER:
DATE:

CONSTRUCTION CHANGE DIRECTIVE NO.	PROPOSAL REQUEST NO.	AMOUNT		DAYS	
		INCREASE	DECREASE	INCREASE	DECREASE

	Amount	Days	Date
ORIGINAL CONTRACT			
TOTAL PREVIOUS CHANGE ORDERS			
TOTAL THIS CHANGE ORDER			
ADJUSTED CONTRACT			

DFCM and Contractor agree that the terms, contract sum, scope of the Work and time specified in this Change Order shall constitute the full accord and satisfaction, and complete adjustment to the Contract and includes all direct and indirect costs and effects related to, incidental to, and/or reasonably implied from such change in the contract terms, sum, scope of the Work and time.

Contractor:_____
Date

Architect/Engineer:_____
Date

Agency or Institution:_____
Date

DFCM: _____
Date

Funding Verification:_____
Date

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____
AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

☐ As-built Drawings ☐ O & M Manuals ☐ Warranty Documents ☐ Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of _____(Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ _____calendar days from the above date of issuance of this Certificate. The amount withheld pending completion of the list of items noted and agreed to shall be: $_____. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____	by:	_____	
CONTRACTOR (include name of firm)		(Signature)	DATE
_____	by:	_____	
A/E (include name of firm)		(Signature)	DATE
_____	by:	_____	
USING INSTITUTION OR AGENCY		(Signature)	DATE
_____	by:	_____	
DFCM (Owner)		(Signature)	DATE

4110 State Office Building, Salt Lake City, Utah 84114 cc: Parties Noted
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov DFCM, Director

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Preparation

B. Clearing and Grubbing

C. Topsoil Removal

D. Asphalt Pavement Removal

E. Portland Cement Concrete Removal

F. Removal of fences and miscellaneous obstructions

G. Disposal of Waste Materials

1.02 RELATED WORK

A. Section 01500 - Construction Facilities and Temporary Controls

B. Section 02220 - Excavating, Backfilling and Compaction

C. Section 02590 - Restoration of Existing Improvements

1.03 QUALITY ASSURANCE

A. All tree trimming and removal shall be done in accordance with recognized tree surgery standards. Coordinate with Owner for any tree or shrub removal needs.

1.04 MEASUREMENT AND PAYMENT

A. Site preparation will not be paid for separately, but shall be included in the lump sum bid. Such price shall constitute full compensation for furnishing and placing of materials required to complete the site preparation, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PREPARATION

A. No clearing, demolition, or removal of any kind shall proceed until all existing trees, improvements, etc. to be removed have been established and have been inspected and documented by the Owner.

B. Establish necessary clearing limits within the construction limits. mark all trees, shrubs, structures, fences, concrete, and other improvements to be removed.

C. Within 10 feet of clearing limits, inspect, photograph with videotape, and record conditions of concrete slabs, structures, trees, landscaping, adjoining construction, and site improvements and features that might be affected by the work. Allow Owner to view tape and approve prior to proceeding with the work.

D. Trees, shrubs and lawn, areas to receive planting, rock outcroppings, fences, sprinklers and other improvements tat are not to be removed shall be protected from damage or injury. If damaged or removed, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Trees, shrubs, and improvements not to be removed shall be marked in the field by Owner and/or shown on the Drawings.

E. Give reasonable notice to Owner to permit him to salvage plants, trees, fences, sprinklers and other improvements within the construction limits that may be destroyed because of the work.

F. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site preparation operations. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

G. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

H. Notify interested utility companies to be present if disturbing ground in the vicinity of utilities.

I. Protect active utility systems adjacent to or uncovered by any excavation during site preparation.

J. Protect and maintain benchmarks, survey control points, monuments and other reference points and construction stakes from disturbance during construction.

K. Protect all improvements to remain outside of construction from tree removal and/or pruning work.

3.02 CLEARING AND GRUBBING

A. Remove all surface features, obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction, including for placement of structural fill or base course.

B. Remove all trees, stumps, roots, etc. within construction limits to a depth of not less than 3 feet below the existing ground.

C. Use only hand methods for grubbing within drip line of remaining trees.

D. Fill depressions caused by clearing and grubbing operations with structural fill, or other material approved by Owner, unless further excavation or earthwork is indicated.

3.03 TOPSOIL REMOVAL

A. Remove sod and grass before stripping topsoil.

B. Before any construction activity begins, remove topsoil to a maximum depth of one foot unless otherwise required by Owner. Prevent intermingling topsoil with underlying subsoil or other waste materials. Stockpile on the same property from which topsoil was removed. Stockpile where required by Owner.

C. Topsoil shall be protected from contamination by weeds, debris, etc. and shall be replaced, graded and lightly compacted by Contractor at completion of project.

3.04 ASPHALTIC CONCRETE PAVEMENT REMOVAL

A. Saw cut full depth along pavement removal limits to create straight removal lines and prevent ragged edges.

3.05 PORTLAND CEMENT CONCRETE REMOVAL

A. Saw cut 4-inches deep along concrete pavement removal limits to create straight removal lines and prevent ragged edges.

B. Concrete sidewalk or driveways to be removed shall be neatly sawed in straight lines either parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than 30 inches in either length or width.

C. Unless otherwise shown on the Drawings, if the saw cut would fall within 30 inches of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge, except that where the saw cut would fall within 12 inches of a score mark, the saw cut shall be made in and along the score mark.

D. Curb and gutter to be removed shall be removed to an existing joint or sawed to a depth of 1-1/2 inches on a neat line at right angles to the curb face.

3.06 FENCES AND MISCELLANEOUS OBSTRUCTIONS

A. No demolition or removal of fences or miscellaneous obstructions shall proceed until clearance is obtained from the Owner.

3.07 DISPOSAL OF WASTE MATERIALS

A. Except for materials indicated to be stockpiled, reused, or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

B. Dispose of removed materials shall be accomplished at a suitable off-site location in accordance with applicable laws and ordinances.

C. No burning shall be allowed.

END OF SECTION

SECTION 02220

EXCAVATING, BACKFILLING AND COMPACTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall provide all materials, labor, equipment, transportation and other items required to perform excavation, backfilling and compaction Work as indicated or as required to accomplish Work of other sections of these specifications. All excavation, backfilling and compaction Work shall be in accordance with applicable regulations and as specified herein.

B. Excavating, backfilling and compaction includes, but is not limited to the following:

1. Preparation

2. Excavation, backfilling and compaction

3. Dewatering and/or runoff control measures

4. Trench shoring

5. Clean up, protection, maintenance

1.02 RELATED WORK

A. Section 02230 - Base Course

B. Section 02590 - Restoration of Existing Improvements

1. Restoration of surfaces or facilities lost, damaged or displaced as a result of Work included in this section.

1.03 REFERENCES

A. The applicable provisions of the latest editions of the References listed below shall govern the Work covered under this Section, unless there is a conflict between said References and the requirements of this Section. In the case of such a conflict, the requirements of this Section shall apply.

B. Utah Occupational Safety and Health Division (UOSHD).

C. American Association of State Highway and Transportation Officials (AASHTO):

D. American Society for Testing and Materials (ASTM)

1.04 SUBMITTALS

A. Submit evidence of materials conformance with applicable requirements as well as these specifications.

B. Submit samples and laboratory test data of imported soil materials.

C. Submit product data for separation fabric.

1.05 QUALITY ASSURANCE

A. Comply with federal, state, and local codes and regulations.

B. All working conditions shall be in accordance with the "Utah Occupational Safety and Health Division," *Safe Practices for Excavation & Trenching Operations,* latest edition, or other Laws or Regulations which apply.

C. Salt Lake City requirements shall govern for all work in Salt Lake City road right-of-ways:

1. All work shall conform to the applicable standards, regulations, and requirements of the Salt Lake City Public Works Department.

2. Permits shall be obtained and paid for by the Contractor.

a. License and Permit Bond, without cancellation clause, in an amount and form prescribed by the Salt Lake City Department of Public Works, shall be provided by the Contractor in connection with his excavations in Salt lake City Right-of-Way.

D. Utah Department of Transportation requirements shall govern for all work in Utah Department of Transportation highway right-of-ways:

1. All work shall conform to the applicable standards, regulations and requirements of the Utah Department of Transportation, including the Specifications for Excavation on State Highways.

2. Permits shall be obtained and paid for by the Contractor.

3. License and Permit Bond, without cancellation clause, in an amount and form prescribed by the Utah Department of Transportation, shall be provided by the Contractor in connection with his excavations on Utah Department of Transportation Right-of-Way.

E. Utah Department of Transportation requirements in Salt Lake City Roads:

1. Where reference is made to Utah Department of Transportation standards in these Specifications for work in Salt Lake City roads, the work shall conform to the applicable Utah Department of Transportation standards.

E. Extended Warranty Period for work in Salt Lake City and Utah Department of Transportation roadways, shall apply.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials suppliers shall provide, upon request, verification of a consistent record of meeting or exceeding materials or performance standards as specified herein.

2.02 FOUNDATION MATERIALS

A. All foundation materials shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectionable or deleterious.

B. Undisturbed soil foundation material:

1. Shall be natural trench bottom soil unless unable to adequately support pipe or structures.

2. Shall not be lumpy or frozen.

C. Gravel:

1. Shall be hard, durable, broken stone or slag.

2. Shall be graded within the following limits:

Sieve	%Passing
1”	100
¾”	85-100
½”	20-40
No. 4	10-20

2.03 BEDDING MATERIALS

A. Sand Bedding Material:

1. Shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectionable or deleterious.

2. Graded within the following limits:

Sieve	% Passing
3/411	100
No. 4	80-100
No. 10	30-50
No. 40	10-30
No. 200	0-15

2.04 BACKFILL MATERIALS

A. Granular backfill:

1. Shall be readily compactable and shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectionable or deleterious.

2. Graded within the following limits:

Sieve	% Passing
3 inch	100
No. 10	50 max.
No. 40	30 max.
No. 200	15 max.

3. May be select material from excavation if it will meet all requirements of granular backfill, including compaction requirements as specified for type of surface improvement above trench.

B. Excavated Soil Backfill Material:

1. Shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectionable or deleterious.

2. Shall be select material from excavation, with no particle larger than 4 inches in diameter.

3. Use on-site materials only if specified compaction requirements can be met.

2.05 STRUCTURAL FILL

A. Structural Fill

1. Naturally or artificially graded mixture of natural or crushed gravel, and natural or crushed sand; ASTM D 2940; well graded, with at least 90 percent passing a 11/2 -inch (38mm) sieve and not more than 17 percent passing a No. 200 (0.075mm) sieve.

2.06 SUBGRADE STABILIZING MATERIAL

A. Use "Granular Backfill" as defined in "Backfill Materials" Section above.

2.07 DRAINAGE FILL

A. Drainage Fill: Washed, narrowly graded mixture of crushed or uncrushed gravel; ASTM D 448; with 100 percent passing a 11/2 -inch (38mm) sieve and 0 to 5 percent passing a No. 8 (2.36mm) sieve.

2.08 STABILIZING FABRIC

A. Separation Fabric: Non-woven geotextile, specifically manufactured for use as a separation stabilization geotextile; made from polypropylene, and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 200 lbf; ASTM D 4632

2. Tear Strength: 75 lbf; ASTM D 4533

3. Puncture Resistance: 1101bf; ASTMD4833

4. Water Flow Rate: 40 gpm per sq. ft.; ASTM D 4491

5. Apparent Opening Size: No. 40; ASTM D 4751

PART 3 EXECUTION

3.01 EXAMINATION

A. It shall be the Contractor's sole responsibility to locate all (whether or not shown on the Drawings) existing water, sanitary sewer, storm drain, and gas lines, electrical and telephone conduit and other underground utilities with their existing house service connections, and all other underground structures in order that no damage or loss of service will result from interference with existing lines.

B. Review all available drawings, notes, and information on the location of these underground lines and structures in determining the location of the existing facilities.

C. Have an electronic pipe finder on the job at all times and mark all lines on the road ahead of the excavating machine.

D. Blue Stakes Location Center shall be contacted 48 hours before any excavation is commenced. Phone 1-800-662-4111 for assistance.

E. Mark with paint any existing cracks on concrete along which work will take place, in order to determine after the construction is completed whether such damage was caused by the operations of the Contractor or had occurred previously. Any concrete showing

unmarked cracks upon completion of construction shall be evidence of damage caused by the Contractor, and shall be replaced or repaired to the satisfaction of the Owner of the damaged concrete, at the Contractor's sole expense.

F. All fences removed for excavation shall be returned to their original condition except that damaged portions will be replaced with new fencing at the Contractor's expense.

G. Obtain all required permits.

3.02 METHODS AND PROCEDURES

A. General Requirements

1. All gas, sanitary sewer, storm drain, water and other pipelines, flumes and ditches of metal, wood or concrete, underground electrical conduits and telephone cable, and all walks, curbs, and other improvements encountered in excavating trenches carefully shall be supported, maintained and protected from injury or interruption of service until backfill is complete and settlement has taken place.

2. If any existing facility is damaged or interrupted, promptly after becoming aware thereof and before performing any Work affected thereby, identify the owner of such existing facility, and give written notice thereof to that owner and the Owner and Engineer. Indemnify the Owner from any and all damages resulting from damaged facilities.

3. All damage, injury or loss resulting from lack of adequate sheeting, bracing, and shoring shall be the responsibility of the Contractor; and the Contractor shall effect all necessary repairs or reconstruction resulting from such damage.

4. The trenches shall not be backfilled until the utilities systems as installed conform to the requirements of the Drawings and Specifications. Where, in the opinion of the Engineer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place.

5. Trenches shall be backfilled to the proper surface with material as shown or specified. Trenches improperly backfilled shall be reopened to the depth required for correction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved.

6. Care shall be exercised so that when backfilling is complete and settlement has taken place, all existing pipes, flumes, ditches, conduits, cables, walks, curbs, and other improvements will be on the same alignment and grade as they were before work commenced.

7. Compaction shall be the responsibility of the Contractor. He shall select the methods to be used and carefully perform the work of backfilling and compaction so as to prevent damage to new or existing piping. Any new or existing piping damaged during the Contractor's work shall be replaced as directed by the Engineer with new piping.

3.03 INSTALLATION

A. Excavation

1. Excavation for pipe lines, concrete valve boxes, manholes and appurtenant structures shall include the work of removing all earth, sand, gravel, quicksand, stone, loose rock, solid rock, clay, shale, cement, hardpan, boulders, and all other materials necessary to be moved in excavating the trench for the pipe; maintaining the excavation by shoring, bracing, and sheeting or well pointing to prevent the sides of the trench from caving in while pipe laying is in progress; and removing sheeting from the trench after pipe has been laid.

2. Trench support system shall be suitable for the soil structure, depth of cut, water content of soil, weather conditions, superimposed loads, vibration. Contractor may select one of the following methods of ensuring the safety of workers in the trench, as approved by the Utah State Industrial Commission or its safety inspectors:

   a. Sloping sides of trench to the angle of repose at which the soil will remain safely at rest.

   b. Shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, or other materials to resist pressures surrounding the excavation.

   c. Using a movable trench box built-up of steel plates and a heavy steel frame of sufficient strength to resist the pressures surrounding the excavation.

3. Trenches shall be of the necessary width for proper laying of pipe. Care shall be taken not to over excavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe along the entire length of the barrel of the pipe.

4. Trenches shall be excavated to the depths shown on the Drawings, including any required allowances for the sewer rock foundation, when required, and for other pipe bedding requirements.

5. The width of trench, measured at the top of the pipe, shall be as narrow as possible, but not wider than 15 inches on each side of sewer or water pipe.

6. Excavation for manholes, concrete valve boxes, and similar structures shall be sufficient to leave at least 12 inches in the clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks.

7. Excess materials shall be hauled away from the construction site or otherwise disposed of by the Contractor as approved by the Engineer.

B. Backfilling

1. Materials for trench backfill shall be as shown on the Drawings.

2. Pipe bedding:

   a. Consists of preparing an acceptable pipe foundation, excavating the pipe groove in the prepared foundation and backfilling from the foundation to 12 inches above the top of the pipe. All piping shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded.

   b. Pipe foundation: Shall consist of natural soil in the bottom of the trench, or a built up foundation if conditions so warrant. Wherever the trench subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, and where groundwater must be drained, the trench shall be excavated below the bottom of the pipe to such depth as may be necessary, and this additional excavation filled with clean, compacted sewer rock.

   c. A pipe groove shall be excavated in the pipe foundation to receive the bottom quadrant of the pipe so that the installed pipe will be true to line and grade. Bell holes shall be dug after the trench bottom has been graded. Bell holes shall be excavated so that only the barrel of the pipe bears on the pipe foundation.

   d. Pipe bedding from pipe foundation to 12 inches above top of pipe: Materials shall be deposited and compacted in layers not to exceed 8 inches in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Materials used shall be as shown in the Typical Trench Section in the Drawings and as specified in Part 2.

3. Each lift shall be evenly spread and moistened or dried by disk harrowing or other means so that the required density will be produced.

4. Backfill around valves with Granular Backfill Material.

5. Place drainage fill around and under sumps, as shown on drawings.

C. Compaction

1. Backfill Compaction Requirements:

   a. Under pavements, or other surface improvements, the average density shall be 96% of laboratory maximum density with no individual test lower than 92% of the laboratory maximum density, as determined by AASHTO Designation T-1 80 (ASTM D-1 557).

b. In shoulders and other unimproved areas, the average density shall be 90% of laboratory maximum density with no individual test lower than 86% of the laboratory maximum density, as determined by AASHTO Designation T-1 80 (ASTM D-1 557).

2. Compaction shall be performed in strict accordance with the manufacturer's recommendations for each type of pipe.

3. Mechanical compaction: Shall be accomplished by the use of sheeps-foot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers of a size and type necessary to achieve the required degree of compaction.

D. Dewatering

1. The Contractor shall do all pumping, shall build all drains and do all the work necessary to keep the trench and pipes free from water during the progress of the work.

2. In wet trenches, a channel shall be kept open along the side of the pipe for conducting the water to a sump hole, from which it shall be pumped out of the trench. No water shall be allowed to enter the pipe.

E. Stabilizing Fabric

1. Install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

3.04 PROTECTION

A. Provide barricades and restrict access as appropriate to prevent damage to Work in place.

B. Contractor shall be responsible for protection of Work in place against displacement, damage, or loss until Owner's acceptance. Any work and subsequently damaged, lost or displaced shall be repaired or replaced to the Owner's satisfaction at no additional cost.

3.05 CLEANING

A. Thoroughly clean, rake, wash, flush or sweep as required to clean adjacent improvements of materials covered as part of this Work prior to submitting for Owner's acceptance.

B. Contractor shall provide all labor, equipment, materials and other items as required to perform clean up as required by the Owner, adjacent property owners and other jurisdictions.

C. Finish grading of areas affected by this Work shall be required as part of clean up.

D. The roadway including shoulders, slopes, ditches, and borrow pits shall be smoothly trimmed, and shaped by machinery, or other satisfactory methods, to the lines, grades and cross-sections, as established, and shall be so maintained until accepted. Any surplus material not suitable for spreading along the road to widen the existing shoulder or raise the grade shall be disposed of as specified above.

3.06 TESTING

A. The Owner shall employ a testing laboratory to perform field and laboratory density tests, except that the Contractor shall make such additional tests, at his expense, as deemed necessary by him to assure that the work of compaction is performed properly, determine any adjustments in compacting equipment, thickness of layers, moisture content and compactive effort or other means necessary to obtain the specified minimum relative density. Provide access to the work and all men and machinery necessary to aid the testing laboratory personnel in performing field density tests or taking samples for laboratory tests. In general, tests and samples shall be made as the work proceeds.

B. The Owner shall have testing laboratory perform maximum density tests on materials to be compacted from samples submitted by Contractor taken from locations selected by the Engineer.

C. The Owner shall have testing laboratory perform field density tests of compacted backfill materials. The approximate location and number of such tests shall be as shown on the drawings, as described in the Bid Form, or as selected by the Engineer. Field density tests shall be taken as follows:

1. In planted or unimproved areas:

    a. 18" above the top of the pipe

    b. Finished grade

2. In streets, roads, parking lots or other paved areas:

    a. 18" above the top of the pipe

    b. 24" to 36" below the gravel road base

    c. Gravel road base subgrade

    d. Top of gravel road base

    e. Top of bituminous surface course

D. Copies of test results prepared by the testing laboratory shall be transmitted to the Contractor at the same time they are transmitted to the Engineer.

E. Successful performance of compaction at the location of the field density test shall not relieve the Contractor of his responsibility to meet the specified density requirements for the complete project.

END OF SECTION

SECTION 02230

BASE COURSE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall provide all materials, labor, tools, equipment, fees, permits, transportation and other items required to furnish and install base course materials as indicated or as required to accomplish Work of other sections of these specifications. Base course Work shall include, but not be necessarily limited to the following:

1. Subgrade preparation to lines and grades shown on the plan.
2. Place, grade and compact base and sub-base course materials.
3. Dust and surface water control.
4. Field quality control.
5. Protection.
6. Cleaning.

1.02 RELATED WORK

A. Section 02220 - Excavating, Backfilling and Compaction

1. Subgrade preparation and compaction requirements

B. Section 02513 – Portland Cement Concrete Paving

1.03 REFERENCES

A. The applicable provisions of the latest editions of the References listed below shall govern the Work covered under this Section, unless there is a conflict between said References and the requirements of this Section. In the case of such a conflict, the requirements of this Section shall apply.

B. American Society for Testing Materials (ASTM).

C. American Association of Safety and Highway Transportation Officials (AASHTO)

D. Utah Occupational Safety and Health Division (UOSHD)

E. Utah Department of Transportation (UDOT)

1.04 SUBMITTALS

A. Submit sample of base course material to appointed testing laboratory for testing at least 10 days prior to use. If recent test results by an approved testing laboratory are available for the material, submit these to engineer in lieu of sample.

1.05 QUALITY ASSURANCE

A. Comply with federal, state, and local codes and regulations.

B. All working conditions shall be in accordance with the "Utah Occupational Safety and Health Division", Safe Practices for Excavation & Trenching Operations, latest edition, or other Laws or Regulations which apply.

C. Salt Lake City requirements shall govern for all work in Salt Lake City road right-of-ways:

1. All work shall conform to the applicable standards, regulations, and requirements of the Salt Lake City Public Works Department.

2. Permits shall be obtained and paid for by the Contractor.

3. License and Permit Bond, without cancellation clause, in an amount and form prescribed by the Salt Lake City Department of Public Works, shall be provided by the Contractor in connection with excavations in Salt Lake City Right-of-Way.

D. Utah Department of Transportation requirements shall govern for all work in Utah Department of Transportation highway right-of-ways:

1. All work shall conform to the applicable standards, regulations and requirements of the Utah Department of Transportation, including the Specifications for Excavation on State Highways.

2. Permits shall be obtained and paid for by the Contractor.

3. License and Permit Bond, without cancellation clause, in an amount and form prescribed by the Utah Department of Transportation, shall be provided by the Contractor in connection with his excavations on Utah Department of Transportation Right-of-Way.

E. Utah Department of Transportation requirements in Salt Lake City Roads:

1. Where reference is made to Utah Department of Transportation standards in these Specifications for work in Salt Lake City roads, the work shall conform to the applicable Utah Department of Transportation standards.

F. Utah Occupational Safety and Health Division (UOSHD)

G. Utah Department of Transportation (UDOT)

1.06 SUBMITTALS

A. Submit sample of base course material to appointed testing laboratory for testing at least 10 days prior to use. If recent test results by an approved testing laboratory are available for the material, submit these to engineer in lieu of sample.

1.07 DELIVERY, STORAGE AND HANDLING

A. All base course materials shall be hauled, delivered, stored and handled in such a manner as to prevent contamination of base course material.

1.08 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

A. Payment for base course will be included in the Lump Sum Bid Price for each item, which requires this work of completion. Such price shall include full compensation for the furnishing and placing of materials required to complete the base course, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.

B. No measurement or payment will be made where SUBGRADE STABILIZING MATERIAL is needed, in the opinion of the Engineer, for construction vehicle traffic or other work-related, operations, including allowing the subgrade to be exposed to adverse weather conditions, rendering it soft and yielding.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials suppliers shall provide, upon request, verification of a consistent record of meeting or exceeding materials or performance standards as specified herein.

2.02 BASE COURSE MATERIAL

A. Road Base for Concrete Curb and Gutter, and Waterways.

1. Unwashed, hard, durable, angular pit run gravel or crushed natural stone.

2. Shall be free from shale, silt, clay, loam, friable or soluble materials.

3. Shall be free from noticeable concentrations of alkali, salt, and petroleum products, all roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that, in the opinion of the Engineer, is objectional or deleterious.

4. Shall be graded within the following limits:

Sieve Size	Percent Passing By Weight
1"	100
3/4"	90-100
1/2"	30-60
3/8"	0-20
#4	0-5

B. Road Base for Asphaltic Concrete Paving:

1. Shall be untreated natural stone.

2. Shall not be lumpy or frozen.

3. Shall be free from noticeable concentrations of alkali, salt, shale, and petroleum products, all roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that, in the opinion of the Engineer, is objectional or deleterious.

4. Shall be graded within the following limits:

Sieve Size	Percent Passing By Weight
3/4"	100
3/8"	75-91
No. 4	60-80
No. 16	28-48
No. 40	11-23
No. 200	5-9

5. Excavated base course from under the existing on-site asphalt may be used if it meets the above specifications and does not become mixed with other soil. Where removal and replacement of existing base course is required on the plans, existing base course and pulverized asphaltic materials may be used in the lower 4 inches of the new base course section. Particle size shall be 2" maximum and shall otherwise meet the requirements for Base Course Material.

6. Imported base Course/pulverized asphalt material may be used in the lower 4" of the new base course section. Material gradation shall meet requirements for Base Course Material. Contractor shall be required to demonstrate from laboratory testing that the CBR (California Bearing Ratio) value of the base course/asphalt material be equal to or exceed that of the new base course material to be used on the project.

2.03 STABILIZING MATERIALS

A. Subgrade stabilizing material:

1. Shall be specified for "Base course" - Gravel

PART 3 EXECUTION

3.01 EXAMINATION

A. It shall be the Contractor's sole responsibility to locate all (whether or not shown on the Drawings) existing water, sanitary sewer, storm drain, and gas lines, electrical and telephone conduit and other underground utilities with their existing house service connections, and all other underground structures in order that no damage or loss of service will result from interference with existing lines.

B. Review all available drawings, notes, and information on the location of these underground lines and structures in determining the location of the existing facilities.

C. Have an electronic pipe finder on the job at all times and mark all lines on the road ahead of the excavating machine.

D. Blue Stakes Location Center shall be contacted 48 hours before any excavation is commenced. Phone 1-800-662-4111 for assistance.

E. Mark with paint any existing cracks on concrete along which work will take place, in order to determine after the construction is completed whether such damage was caused by the operations of the Contractor or had occurred previously. Any concrete showing unmarked cracks upon completion of construction shall be evidence of damage caused by the Contractor, and shall be replaced or repaired to the satisfaction of the Owner of the damaged concrete, at the Contractor's sole expense.

F. All fences removed for excavation shall be returned to their original condition except that damaged portions will be replaced with new fencing at the Contractor's expense.

G. Obtain all required permits.

3.02 METHODS AND PROCEDURES

A. General Requirements

1. All gas, sanitary sewer, storm drain, water and other pipelines, flumes and ditches of metal, wood or concrete, underground electrical conduits and telephone cable, and all walks, curbs, and other improvements encountered in excavating for base course shall be supported, maintained and protected from injury or interruption of service until installation is complete.

2. If any existing facility is damaged or interrupted, promptly after becoming aware of the same and before performing any Work affected thereby (except in an

emergency), identify the owner of such existing facility, and give written notice thereof to that owner and the Owner of this project.

3. All damage, injury or loss resulting from lack of adequate sheeting, bracing, and shoring shall be the responsibility of the Contractor; and the Contractor shall effect all necessary repairs or reconstruction resulting from such damage.

3.03 INSTALLATION

A. Preparation of Subgrade

1. Prior to placing base course materials, the subgrade shall be scarified to a depth of not less than 6", moistened or dried to optimum moisture content, rolled with a sheepsfoot roller, and compacted to at least 96% maximum Modified Proctor Density as determined in accordance with ASTM D1557 (AASHTO T-180), and shall be within 2% of optimum moisture content.

2. The subgrade shall then be proof rolled in the presence of the Engineer by passing loaded rubber-tired construction equipment uniformly over the surface at a constant rate. At least two (2) passes shall be made over all subgrade areas.

3. If excessively soft, loose, or disturbed soils are encountered, they shall be removed as directed by the Engineer to a maximum depth of three feet (3') and replaced and recompacted to 96% maximum Modified Proctor Density using approved subgrade stabilizing material or in the judgment of the Engineer, the Contractor may be instructed to halt construction activities after scarifying to allow soils to dry and stabilize.

4. Ensure subgrade is to required lines and elevations.

5. Protect against “pumping” moisture to surface by limiting travel on exposed subgrade. Where it is determined by Engineer that construction vehicle traffic or exposure to adverse weather conditions has caused subgrade instability, remove disturbed soil and replace with SUBGRADE STABILIZING MATERIAL in accordance with (2) above, at no cost to Owner.

B. Placement of Base Course

1. Place base course material on the prepared and accepted subgrade. The material shall be back-dumped and spread in a uniform lift thickness.

2. Handle and spread materials in a manner that will prevent segregation of sizes. When vibrating or other acceptable types of compaction equipment are used, the entire course may be placed in one layer, provided the ability of the equipment to achieve specified compaction to the full layer depth is demonstrated. In no case shall compacted lift thickness be greater than 8".

3. When base course is constructed in more than one layer, the previously placed layer shall be cleaned of loose and foreign matter. Upper layer of base course shall not be less than 1-1/2", nor shall fine materials be added to reach final grade.

4. Overstressing the subgrade soil and base course shall be avoided by utilizing equipment in spreading and dumping that exerts only moderate pressures on the soil. Avoid excessive travel on lower base course lifts. Severe rutting, cracking or yielding is an indication of overstressing the soil. Any ruts or cracks which develop in the base course during spreading or compacting shall be repaired as directed at no additional cost to Owner.

5. Base course shall be compacted to no less than 96% maximum Modified Proctor Density, as determined by ASTM D1557 (AASHTO T-180). Moisture content shall be maintained to within 1.0% of optimum throughout placing and compaction operations.

    a. Compaction shall always be commenced along the edge of the area to be compacted and the roller shall gradually advance toward the center of the area to be compacted.

    b. Compaction equipment shall be operated along lines parallel or concentric with the centerline of the road being constructed, and no material variation there from will be permitted.

6. Base course shall be substantially true to line and grade as indicated on the drawings. The surface shall be within 1/2" of required grade. Completed thickness of base course shall be within 1/2" of indicated thickness, with average thickness not less than that indicated.

7. The top surface of compacted base course shall be finished by blading or rolled with equipment designed for that purpose.

8. Temporary Graded Surface

    a. When allowed by the local jurisdiction having authority, where trenches are excavated in paved traffic lanes, the surface course may be temporarily replaced by a surface consisting of base course material. The base course shall be removed and replaced with pavement as soon as conditions permit, or as required by local jurisdiction having authority.

    b. The surface shall be maintained to provide for a smooth flow of traffic without holes, bumps, etc., until final acceptance of the work.

C Dust and Surface Water Control

1. Dust control measures shall be implemented by application of water to all work areas, storage areas, haul and access roads, or other areas affected by work.

2. All work shall be in compliance with the Federal, State and local air pollution standards, and not cause a hazard or nuisance to personnel and the public in the vicinity of the work.

3. Provide and operate at least one (1) mobile tank sprinkling unit during the contract period.

4. Other methods of dust control for haul and access roads may include chemical treatment, light bituminous treatment or other method as approved by the Owner.

5. Surface water shall be controlled to the extent that the areas to receive pavement, walks or slabs are not allowed to become wet from runoff from adjacent areas. Surface water shall be directed away from these areas but not directed toward adjacent property, buildings, or any improvement that may be damaged by water. Surface water shall not be allowed to enter sanitary sewers.

3.04 PROTECTION

A. Provide barricades and restrict access as appropriate to prevent damage to Work in place.

B. Contractor shall be responsible for protection of Work in place against displacement, damage, or loss until Owner's acceptance. Any work and subsequently damaged, lost or displaced shall be repaired or replaced to the Owner's satisfaction at no additional cost.

3.05 FIELD QUALITY CONTROL

A. Contractor shall work with a testing laboratory, employed by the owner, to inspect and approve subgrade and base course layers and trench backfill before further construction work is preformed.

B. If tests indicate that sub-base and/or base course do not meet specified requirements, remove defective work, replace and retest at no cost to Owner.

3.06 CLEANING

A. Thoroughly clean, rake, wash, flush or sweep as required to clean adjacent improvements of materials covered as part of this Work prior to submitting for Owner's acceptance.

B. Contractor shall provide all labor, equipment, materials and other items as required to perform clean up as required by the Owner, adjacent property owners and other jurisdictions.

C. Finish grading of areas affected by this Work shall be required as part of clean up.

END OF SECTION

SECTION 02511

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall provide all materials, labor, tools, equipment, fees, permits, transportation and other items required to furnish and install asphaltic concrete paving as indicated or as required to accomplish Work of other sections of these specifications. Asphaltic concrete paving work shall include, but not be necessarily limited to the following:

1. Proof roll base course to reveal soft and yielding spots.

2. Place and compact asphaltic concrete paving.

3. Pavement Markings.

4. Protection of newly placed pavement.

1.02 RELATED WORK

A. Section 01500 - Construction Facilities and Temporary Controls:

1. For traffic regulation and barricades.

B. Section 02220 - Excavating, Backfilling and Compaction

1. For subgrade preparation, stabilization material and stabilization fabric.

C. Section 02230 - Base Course

1.03 REFERENCES

A. American Society for Testing Materials (ASTM):

1. D1557, “Test for Moisture - Density Relationship of Soils using 10 lb (4.5 kg) Rammer in 18 inch (457 mm) Drop”.

2. D1559, “Resistance to Plastic Flow of Bituminous Mixtures using Marshall Apparatus”.

3. D2170, “Kinematic Viscosity of Asphalts (Bitumens)”.

B. THE ASPHALT INSTITUTE (A.I.) Specification series No. 2 (SS-2)

C. American Association of State Highway and Transportation Officials (AASHTO):

1. Materials and compaction tests.

D. State of Utah Standard Specifications for Road and Bridge Construction, latest edition including Supplement #2.

1. Section 704.03 Asphaltic Cement.

1.04 SUBMITTALS

A. Submittals shall include, but not necessarily be limited to the following:

1. An asphaltic concrete paving mix design prepared by certified laboratory and materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements and shall be submitted for review and approval at least two weeks prior to commencement of the work.

2. Written certification of compliance for pavement marking paint.

1.05 QUALITY ASSURANCE

A. Do not place asphaltic concrete paving when the air temperature in the shade and/or the roadbed temperature is below 50° F, or during rain, when the base course surface is wet, or during other adverse weather conditions.

B. Do not place tack coat when air temperature in the shade and the roadbed temperature are below 50° F, or during rain, fog, or other adverse weather conditions.

C. All work shall be performed by experienced and qualified workmen with equipment standard in the industry.

D. Approval by Engineer of sources of supply of materials shall be obtained prior to delivery of materials.

E. Comply with federal, state and/or local codes and regulations.

1.06 DELIVERY, STORAGE AND HANDLING

A. Contractor shall be responsible for proper storage of all equipment and materials to be provided as part of this specification in accordance with the manufacturer's recommendations and shall be responsible for security and proper handling of such equipment and materials at the project site.

B. Any materials lost, stolen, or damaged prior to Owner's final acceptance is to be replaced or repaired to the Owner's satisfaction by the Contractor at no additional cost to the Owner.

1.07 WARRANTY

A. 2 years from date of substantial completion.

1.08 METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

A. No measurement will be made.

B. Payment will be included in the lump sum contract amount.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials suppliers shall provide, upon request, verification of a consistent record of meeting or exceeding materials or performance standards as specified herein.

2.02 MATERIALS

A. Asphaltic cement:

1. Viscosity Graded original, AC-10, conforming to requirements of ASTM D-3381 (AASHTO M-226, Table 2), and Section 704.03 - State of Utah Standard Specifications for Road and Bridge Construction.

2. Shall not foam when heated to 350° F.

B. Mineral aggregate:

1. Shall consist of crushed stone, crushed gravel, or crushed slag, or a combination thereof; free of clay, silt, organic matter or other deleterious materials.

2. Gradation shall be in accordance with the following:

a. Asphaltic concrete ½":

Sieve Size	Percent Passing by Weight
1/2"	100
#4	55 - 85
#16	24 - 38
#50	9 - 21
#200	4 - 8

3. Course aggregate, retained on the No. 4 sieve shall consist of clean, hard, rough, durable and sound fragments, with not less than 50 percent of particles by weight with at least one mechanically fractured face or clean angular face.

4. Fine aggregate passing the No. 4 sieve may be either a natural or manufactured product. The aggregate shall be clean, hard grained and moderately sharp, and shall contain not more than 2 percent by weight of vegetable matter or other deleterious substances.

5. That portion of the fine aggregate passing the No. 40 sieve shall be nonplastic when tested in accordance with ASTM D-424.

6. The weight of minus 200 mesh material retained in the aggregate, as determined by the difference in percent passing a No. 200 sieve by washing and dry sieving without washing, shall not exceed 6 percent of the total sample weight. That portion of fine aggregate passing the No. 200 sieve shall be determined by washing with water in accordance with ASTM C-117.

7. The aggregate shall be of uniform density and quality and shall have a rodded weight of not less than 100 pounds per cubic foot when tested in accordance with ASTM C-29.

8. The aggregate shall have a percentage of wear not exceeding forty when tested in accordance with ASTM C-131 and C-535.

9. The aggregate shall have a weighted loss not exceeding 12 percent by weight when subject to five cycles of sodium sulfate and tested in accordance with ASTM C-88, D-1073, and D-692.

2.03 ASPHALTIC CONCRETE PAVING MIXTURE

A. Combine mineral constituents and asphalt cement in proportions per mix design at a central plant to produce an asphaltic concrete pavement mix.

B. Mix design shall be based on the Marshall Method. The combined mineral aggregate plus any approved additives when mixed with the asphaltic cement in accordance with ASTM D-1559 shall conform to the following requirements:

1. Marshall Stability: 1200 pounds minimum

2. Flow (0.01 inch): 10 - 18

3. Voids Content: 1.5% to 3%

4. Asphaltic Cement Content: 5% to 6% by weight

C. The asphaltic cement shall be heated at the mixing plant to a temperature at which it can be applied uniformly to the aggregate.

D. Coarse and fine aggregate shall be stored separately at the mixing plant in a manner that will prevent intermingling.

E. When it is necessary to blend aggregates from one or more sources to produce the combined gradation, each source or size of aggregate shall be stockpiled individually. Aggregate from the individual stockpiles shall be fed through separate bins to the cold elevator feeders. They shall not be blended in the stockpile.

F. Cold aggregates shall be fed carefully to the plant so that surpluses and shortages will not occur and cause breaks in the continuous operation.

G. The aggregate shall be dried and heated to provide a paving mixture temperature in conformance with placing conditions, but not to exceed 163°C (325°F).

H. The heated and dried aggregates shall not contain enough moisture to cause the mixture to slump, the asphalt to foam, or the aggregate to segregate during hauling and placing.

I. The shortest mixing time consistent with satisfactory coating of the aggregate shall be used. The mineral aggregate shall be considered satisfactorily coated with asphaltic cement when all of the particles passing the No. 4 sieve and 96 percent of the particles retained on the No. 4 sieve are coated with asphaltic cement. The required mixing time, as determined above, shall be in accordance with ASTM D-2489.

J. If a dryer drum mixing process is used, the mineral aggregate shall be considered satisfactorily coated with asphaltic cement when all of the particles passing the No. 4 sieve and 98 percent of the particles retained on the No. 4 sieve are coated with asphaltic cement. The moisture content of the asphaltic cement sampled behind the laydown machine prior to compaction shall not exceed 1 percent by weight.

2.04 TACK COAT

A. Cut-back asphalt RC or MC 70 or 250.

2.05 MARKING PAINT

A. Alkyd resin, white in color, factory mixed, quick-drying, and non-bleeding, complying with Section 713.07 of the Utah State Department of Transportation Standard Specification for Road and Bridge Construction. Contractor to apply two (2) coats of marking paint for all striping.

PART 3 EXECUTION

3.01 EXAMINATION

A. Coordinate layout and installation of paving materials with other construction elements to ensure adequate headroom, working clearance, and access.

B. Examine surfaces to receive asphaltic concrete paving for compliance with installation tolerances and other conditions affecting performance of the pavement system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 METHODS OR PROCEDURES

A. Preparation

1. Proof roll base course surface. Replace wet, spongy, soft, uncompactable or other unsuitable material with new base course material at no additional cost. Finish and compact repaired area as specified in Section 02230 - Base Course.

2. Ensure base course surface is to required elevation. Remove loose material from base course surface.

3. Do not place prime coat or asphaltic concrete paving until base course installation has been approved by the Construction Manager.

B. Transporting the Asphaltic Concrete Pavement

1. Transport time from the mixing plant to the job site shall not exceed 1 hour.

2. The hauling truck shall have no direct frame contact with the paver or bear down on the paver during dumping operations.

3.03 INSTALLATION

A. Tack Coat

1. Prior to placing pavement, a tack coat shall be applied to the vertical edges of concrete and "cold" pavement (over 1/2 hour old), which will be in contact with new pavement. Tack coat shall extend 12 inches onto adjacent base course material. The tack coat shall be carefully applied at a rate of 0.15 gal/SY. Tack coat shall also be applied uniformly at the same rate to the horizontal top surface of each lift of bituminous pavement prior to placing the next lift of bituminous pavement to promote a bond between the two courses of pavement. None of the material shall penetrate into the pavement and for this reason the application should be limited.

2. Prior to applying the material, the surface to be treated shall be swept or flushed free of dust or other foreign material.

3. Protect all surfaces not required to receive tack coat from any inadvertent application.

4. The temperature range of the tack coat at the time of application shall be such that the viscosity will be between 50 and 100 centistokes as determined in accordance with ASTM Designation D-2170.

5. Under no circumstances shall traffic be permitted to travel over the tacked surface. If detours cannot be provided, restrict operation to a width that will permit at least one-way traffic over the remaining portion of the roadbed. If one-way traffic is provided, the traffic shall be controlled in accordance with governing authority.

6. After application of tack coat, sufficient time shall be given to allow for complete separation of asphalt and water before paving operations begin. The tack coat shall be applied on only as many surfaces as will be paved against in the same day.

7. Under no circumstance shall traffic be permitted to travel over tacked surface. If detours cannot be provided, restrict operation to a width that will permit at least one-way traffic over the remaining portion of the roadbed. If one-way traffic is provided, the traffic shall be controlled in accordance with governing authority.

B. Placement of Asphaltic Concrete Pavement

1. Place asphalt pavement to provide a compacted depth as indicated on the plans. Placing the pavement shall be a continuous operation. The machine shall spread mixture and shall strike a finish that is smooth, true to cross section, uniform in density and texture, and free from hollows and other irregularities. If any irregularities occur, they shall be corrected before final compaction of the mixture. The paving machine shall be self-propelled, equipped with hoppers, distributing screws, adjustable screeds and equalizing devices, capable of spreading hot asphaltic concrete paving mixtures without tearing, shoving or gouging, and of producing a finished surface of specified quality. Place inaccessible and small areas by hand.

2. Ensure asphalt pavement temperature is between 150 and 300 centistokes as determined with ASTM D-2170 when mixing with a pugmill, or between 220°F and 260°F when using the dryer-drum mixing process, immediately after placing and prior to initial rolling.

3. Ensure joints made during paving operations are straight, clean, vertical and free of broken or loose material. Carefully make joints to insure a continuous bond between old and new pavement, or between successive day's work. A continuous bond between adjoining work is required.

4. If more than 1/2 hour elapses between adjacent paving passes, the "cold joint" shall have tack coat applied to the "cold" pavement prior to placing the adjacent pass.

C. Compaction

1. Roll and compact to specified density before temperature of the mixture drops below 180°F.

2. Compact asphalt paving course to required density, with a steel wheeled tandem roller, steel three-wheeled roller, vibratory roller, or a pneumatic-tired roller, weighing not less than five tons. Start compaction as soon as pavement will bear equipment without checking or undue displacement. Speed of roller shall be slow enough to avoid displacement of hot mixture, and any displacements occurring as a result of changing the direction of the roller, or from any other cause, shall at once be corrected by the use of rakes and of fresh mixture where required. Ensure each pass of roller overlaps previous passes by at least 1/2 of the roller width to ensure smooth surface free of roller marks. Keep roller wheels

sufficiently moist so as not to pick up material. Rolling shall continue until roller marks are eliminated and no further compression is possible. The finished compacted pavement shall have a density of 96% minimum, no test less than 92% of the density determined in accordance with ASTM D-2041.

3. Leave pavement with a uniform, dense surface.

4. Perform hand tamping in areas not accessible to rolling equipment. Thorough compaction must be achieved, and joints between curbs, headers, manholes and similar structures must be effectively sealed.
Do not allow vehicular traffic on newly paved areas until surface has cooled to atmospheric temperature.

D. Pavement Marking

1. Unless otherwise directed by Construction Manager, the painting of parking stripes shall be commenced not earlier than 15 days after completion of the asphaltic concrete paving.
2. Prior to painting, broom or sweep the surface to remove dirt, loose stones or other foreign material. Solvent material that will damage pavement shall not be used as cleaning agents.
3. Apply two (2) coats of marking paint for all striping.

3.04 PROTECTION

A. Provide barricades and restrict access as appropriate to prevent damage to Work in place.

B. Contractor shall be responsible for protection of Work in place against displacement, damage, or loss until Owner's acceptance. Any work and subsequently damaged, lost or displaced shall be repaired or replaced to the Owner's satisfaction at no additional cost to Owner.

C. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

3.05 FIELD QUALITY CONTROL

A. Testing and observation of asphalt pavement mix and asphalt pavement installation will be performed by testing laboratory in accordance with Division of Facilities, Construction and Management (DFCM). Testing and observation will be performed so as to minimize disruption to Work.

B. Testing laboratory shall verify weight or proportions, character of materials used and temperatures used in the preparation of asphaltic concrete mix.

C. Testing laboratory will perform one laboratory test on proposed asphalt pavement mix to determine conformity with requirements.

D. The testing laboratory will perform at least one series of compaction test for asphalt pavement, following pavement curing. Location of samples to be selected by the Engineer.

E. Ensure surface of completed asphalt pavement is true to lines, profiles and elevations indicated, and is free from depressions exceeding 1/8 inch when measured with a 10 ft. straightedge. The thickness of compacted pavement shall be within 1/4 inch of the design thickness, with the average thickness not less than the design thickness.

F. If tests indicate that asphalt paving does not meet specified requirements, remove defective work, replace and retest at Contractor's expense.

G. Areas not capable of being corrected by rerolling shall be removed and be rectangular in shape and completely enclosing the area to be corrected, with sides parallel or perpendicular with pavement edges. Skim patching is not permitted.

3.06 CLEANING

A. Thoroughly clean, rake, wash, flush or sweep as required to clean adjacent improvements of materials covered as part of this Work prior to submitting for Owner's acceptance.

B. Contractor shall provide all labor, equipment, materials and other items as required to perform clean up as required by the Owner, adjacent property owners and other jurisdictions.

C. Finish grading of areas affected by this work shall be required as part of clean up.

D. The roadway including shoulders, slopes, ditches, and borrow pits shall be smoothly trimmed, and shaped by machinery, or other satisfactory methods, to the lines, grades and cross-sections, as established, and shall be so maintained until accepted. Any surplus material not suitable for spreading along the road to widen the existing shoulder or raise the grade shall be disposed of as specified above.

END OF SECTION

SECTION 02513

PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall provide all materials, labor, tools, equipment, fees, permits, transportation and other items required to furnish and install concrete sitework as indicated or as required to accomplish Work of other sections of these specifications. All concrete sitework shall be in accordance with applicable regulations and as specified herein.

B. Concrete sitework includes, but is not limited to the following:

1. Form Construction
2. Concrete Materials
3. Placing Concrete
4. Sidewalk and Curb and Gutter Joints
5. Pavement Joints
6. Hot and Cold Weather Concreting
7. Finishing
8. Curing
9. Testing, Clean-up and Protection

1.02 RELATED WORK

A. Section 02220 - Excavating, Backfilling and Compaction

1. Materials and compaction requirements for subgrades beneath paved areas.

B. Section 02230 – Base Course

1.03 REFERENCES

A. The applicable provisions of the latest editions of the References listed below shall govern the Work covered under this Section, unless there is a conflict between said References and the requirements of this Section. In the case of such a conflict, the requirements of this Section shall apply.

B. American National Standards Institute (ANSI)

C. The American Concrete Institute (ACI)

D. American Society for Testing and Materials (ASTM)

E. American Association of State Highway and Transportation Officials (AASHTO)

1.04 SUBMITTALS

A. Submit evidence of materials conformance with applicable requirements as well as these specifications.

B. Submittals generally include, but are not limited to the following:

1. A mix design shall be submitted to Engineer at least two weeks prior to commencement of the work.

2. Submit construction, expansion and contraction joint layout plan for review and approval at least 14 days prior to start of concreting.

3. Submit manufacturer's data for all materials used.

4. Provide weight tickets to owner's representative for all ready-mixed concrete at the time of delivery to the site.

1.05 QUALITY ASSURANCE

A. Qualifications of Workmen:

1. Use workmen thoroughly trained and experienced in placing and finishing the types of concrete specified. Provide a minimum of one ACI certified flatwork finished with each concrete finishing crew.

B. Comply with federal, state and local codes and regulations.

C. Comply with hot or cold weather requirements when applicable.

D. Two (2) Year Written Guarantee.

1. Provide two year written guarantee to the Owner, in form approved by the Engineer to promptly remove and/or repair defective concrete (cracking, spalling, pitting or honeycombing) as directed by Engineer and at Contractor's expense. New replacement work shall carry a similar two-year written guarantee. Guarantee shall start from Date of Substantial Completion.

1.06 DELIVERY, STORAGE AND HANDLING

A. Contractor shall be responsible for proper storage of all equipment and materials to be provided as part of this specification in accordance with the manufacturer's recommendations and shall be responsible for security and proper handling of such equipment and materials at the project site.

B. Any materials lost, stolen, or damaged prior to Owner's final acceptance is to be replaced or repaired to the Owner's satisfaction by the Contractor at no additional cost to the Owner.

C. Ready-mixed concrete: Concrete shall be mixed only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80'F and sixty minutes for temperatures above 80'F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.

1.07 PROJECT CONDITIONS

Not Used

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT CONCRETE MATERIALS

A. Cement:

1. Portland cement shall be Type II, complying with ASTM C-150 - Standard Specification for Portland Cement.

B. Coarse Aggregates:

1. Shall conform to ASTM C33 - Standard Specification for Concrete Aggregates.

2. Coarse aggregate shall be graded within the following limits:

Sieve	%Passing
1 – ½”	100
1”	95-100
½”	25-60
No. 4	10-40

3. Coarse aggregate shall consist of gravel, crushed slag, or crushed stone, composed of hard, strong and durable particles, free of injurious coatings.

C. Fine aggregate:

1. Shall conform to ASTM C33.

2. Fine aggregate shall consist of natural sand, composed of hard, strong and durable particles.

3. Fine aggregate shall be uniformly graded from coarse to fine within the following gradation:

Sieve	%Passing
¾"	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

D. Water:

1 Water used in washing aggregate and mixing concrete shall be of a potable quality clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances.

E. Admixtures:

1. No admixture will be permitted to be used in Portland cement concrete except for an air entraining agent, and a concrete coloring agent.

F. Air entraining agent:

1. Shall be used in all concrete.

2. The agent shall conform to ASTM Designation C260 - Standard Specification for Air Entraining Admixtures for Concrete.

3. Shall be added at the mixer.

G. Concrete curing compound:

1. Liquid membrane curing compound shall comply with ASTM Designation C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, Type 11 Class A. Moisture loss not more than 0.055 gr./sq. cm when applied at 200 sq. ft./gal.

2.02 PORTLAND CEMENT CONCRETE MIX

A. Portland Cement Concrete shall consist of a mixture of water, Portland Cement, fine and coarse aggregates, and an air entraining agent.

B. The proportions of the concrete materials shall produce a mixture that will work readily into corners and angles of forms and around reinforcing steel.

C. The methods of measuring concrete materials shall permit proportions to be accurately controlled and easily checked. Measurement of materials for ready-mixed concrete shall conform to ASTM C94 - Standard Specification for Ready-Mixed Concrete.

D. Concrete mix design:

Intended Use:	Storm drainage, curbs, walks and driveways.
Coarse Aggregate Size:	1”
Minimum Cement Content	6.5 sacks / CY
Minimum 28 Day Compressive Strength:	4000 psi
Minimum 28 Day Flexural Strength	550 psi
Required Slump	2.5 – 4 inches
Air Entrainment	5 – 6.5 percent

E. The contractor shall be responsible for the mix design.

2.03 JOINT MATERIALS

A. Filler material shall be pre-formed, non-extruding resilient type complying with ASTM D-544 of thickness to fill joint.

B. Joint sealant shall be polyurethane based, self leveling, one part elastomeric sealant complying with FS-TT-SO0230 Class A Type 1. (unless Type 11 is recommended by manufacturer for application). Select marketing materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration.

2.04 CONCRETE REINFORCEMENT

A. Reinforcing steel:

1. All reinforcing bar material used for reinforcement of concrete shall be intermediate Grade 60 steel conforming to the requirements of ASTM A-615.

2. All rods shall be deformed and round.

3. All reinforcement shall be uncoated, free from rust, scale, form oil, etc.

4. Welded wire fabric for concrete reinforcement shall conform to ASTM A-1 85.

B. Accessories:

1. All accessories, including such items as chairs, spacers, saddles, etc., shall be of steel formed in such a manner and with sufficient strength to perform the intended functions. Chairs, spacers, saddles, etc., which are set in contact with forms, are to be galvanized or provided with plastic tips or coating to prevent rust spots on finish concrete surface.

C. Wire:

1. All tying steel shall not be less than 18 gage annealed iron lacing wire. All wire tie ends shall point away from forms.

2.05 FORM MATERIALS

A. Forms shall be of suitable material and of a type, size, shape, quality, and strength to insure construction as designed.

B. Metal forms for exposed surfaces may be used when all bolt and rivet holes are countersunk so that a plane, smooth surface of the desired contour is obtained.

C. Rough lumber may be used for forming surfaces that will be covered by earth in the finished structure.

D. Forms for all surfaces that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood.

E. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished work. Any lumber or material which becomes badly checked or warped, prior to placing concrete, shall not be used.

F. All forms shall be free of bulge and warp, and shall be cleaned thoroughly before being used.

2.06 EQUIPMENT

A. The use of Power Screed equipment will be required for all concrete pavement work.

B. Slip-Form Paver:

1. At the option of the Contractor, and with the approval of the Engineer, concrete pavement may be constructed by the use of slip-form paving equipment. The slip-form paver shall consist of a self-propelled, self-powered machine capable of spreading, vibrating, tamping, striking-off, and shaping the concrete to the desired line, grade, and thickness in one continuous passage.

2. The slip-form paver shall be equipped with internal-type vibrators meeting the following requirements:

Eccentric Diameter	1-7/8 inch
Frequency	9,500 vibrations per minute (min)
Spacing	24 inches maximum when mounted transversely; 18 inches when mounted longitudinally

3. The vibrators shall be operated horizontally at the height of the midpoint of the concrete slab and shall be mounted so they will maintain this position. The vibrators may be mounted in a traverse or longitudinal position.

4. Each vibrator shall be equipped with an indicator light or other electrical device that will indicate whether or not the vibrator is operating. The lights or other devices shall be mounted on the paving machine so they can be easily seen by the operator and the inspector. If the lights or other devices show that a vibrator or vibrators are not operating properly, the paving operations shall be stopped immediately. Paving operations shall not be resumed until the faulty vibrator or vibrators have been repaired or replaced.

5. The paver shall be capable of providing a continuous deposit of concrete with a minimum of starting and stopping. Trailing forms shall be of a sufficient length to leave a smooth, straight, vertical edge or a keyed longitudinal construction joint of the shape shown on the Drawings. The trailing forms shall be held in position by suitable devices sufficiently rigid to prevent spreading of the forms under the weight of the concrete and finishing operations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Coordinate layout and installation of concrete sitework with other construction elements to ensure adequate headroom, working clearance, and access.

B. Examine surfaces to receive concrete sitework for compliance with installation tolerances and other conditions affecting performance of the paving system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 METHODS OR PROCEDURES

A. Preparation

1. Remove all wood scraps, ice, snow, frost and debris from the areas in which concrete will be placed.

2. Thoroughly clean the areas to ensure proper placement and bonding of concrete.

3. All reinforcement shall be free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease, and shall present a clean surface.

4. Thoroughly wet the forms (except in freezing weather), or oil them and remove all standing water.

5. Thoroughly clean all transporting and handling equipment.

6. Notify the Owner at least 24 hours before placing concrete.

7. Obtain the Architect/Engineer's approval of location of all construction joints and control joints in the Work prior to start of concrete placement.

8. Erect and maintain suitable barriers to protect the finished surface. Any section damaged from traffic or other causes occurring prior to its official acceptance, shall be repaired or replaced by the Contractor at his own expense in a manner satisfactory to the Architect/Engineer.

B. Hot Weather Concreting

1. Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties. Hot weather concreting shall follow the guidelines of ACI 305R, latest edition.

2. Undesirable hot weather effects on concrete in the plastic state may include:

   a. Increased water demand.

   b. Increased rate of slump loss and corresponding tendency to add water at job site.

   c. Increased rate of setting resulting in greater difficulty with handling, finishing, and curing, and increasing the possibility of cold joints.

   d. Increased tendency for plastic cracking.

   e. Increased difficulty in controlling entrained air content.

3. Undesirable hot weather effects on concrete in the hardened state may include:

   a. Decreased strength resulting from higher water demand and increased temperature level.

   b. Increased tendency for drying shrinkage and differential thermal cracking.

   c. Decreased durability.

   d. Decreased uniformity of surface appearance.

4. Placing and curing:

   a. Concrete shall be handled and transported with a minimum of segregation and slump loss. Concrete temperature at time of placement shall be such that the rate of evaporation for the weather conditions shall not cause cracking.

   b. The aggregate shall be cooled by frequent spraying in such a manner as to utilize the cooling effect of evaporation. The placement schedule shall be arranged, as approved, in such a manner as to provide time for the temperature of the previously placed course to begin to recede. The mixing water shall be the coolest available at the site insofar as is practicable.

   c. Concrete shall be placed where it is to remain.

   d. Concrete shall be placed in layers shallow enough to assure vibration well into the layer below.

   e. Surfaces exposed to the drying wind shall be covered up immediately after finishing with polyethylene sheets and be water cured continuously as soon as the concrete has set up. Curing compounds, in lieu of water, may be used.

   f. Joints are made on sound, clean concrete.

   g. Finishing operations and their timing be shall be guided only by the readiness of the concrete for them, and nothing else.

   h. Curing shall be conducted in such a manner that at no time during the prescribed period will the concrete lack ample moisture and temperature control. Facilities must be ready to protect promptly all exposed surfaces from drying. All work determined by Engineer to be damaged from hot weather shall be removed and replaced at no cost to Owner.

   i. All materials and workmanship required to meet the hot weather requirements shall be supplied at the Contractor's own expense.

C. Cold Weather Concreting

1. Cold weather is generally defined as a period when for more than 3 successive days the mean daily temperature drops below 40°F. When temperatures above 50°F occur during more than half of any 24-hour period, the weather should no longer be regarded as "cold". The times and temperatures given for various conditions and situations are not exact values and should not be used as such. Weather conditions are variable and common sense must be used to protect the concrete. Cold weather concreting shall follow the guidelines of ACI 306R, latest edition.

2. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor's own expense.

   a. Preparation:

      i. When specific written authorization is given to permit concreting operations at temperatures below those specified herein, arrangements for covering, insulating, housing, or heating materials and/or newly-placed concrete should be made in advance of placement and should be adequate to achieve the temperature and moisture conditions recommended herein in all parts of the concrete. All equipment and materials necessary should be at the work site before the first frosts are likely to occur, not after concrete has been placed and its temperature begins to approach the freezing point.

   b. Concrete Temperature:

      i. The temperature of the concrete as mixed shall be maintained as shown in the following table:

Air Temperature	Minimum Concrete Temperature as mixed
Above 30°F	60°F
0°F to 30°F	65°F
Below 0°F	70°F

      ii. The minimum concrete temperature as placed and maintained shall be 55°F.

   c. Placement and protection:

      i. During placement of concrete, tarpaulins, or other readily movable coverings supported on horses or framework should follow closely the placing of the concrete so that only a few feet of concrete are exposed to outside air at any time.

      ii. The housing, covering, or other protection used in curing shall remain intact at least 24 hours after artificial heating is discontinued.

      iii. All concrete placed in forms shall have a temperature between 55° and 70° after placement. Adequate means shall be provided for maintaining the surrounding air at 60°F for at least seventy-two (72) hours after placing and at no less than 40°F for an additional four days. All methods and equipment for heating shall be subject to approval. Insulating blankets shall be used when required to maintain a satisfactory temperature during the curing period.

iv. No dependence shall be placed on salt or other chemicals for the prevention of freezing.

v. If heating or other protective measures need to be taken to prevent concrete from freezing, the concrete may require special curing methods to prevent rapid drying, as described in ACI 306R-78.

vi. Salt or other chemicals shall not be used for prevention of freezing.

3.03 INSTALLATION

A. Form Construction

1. Forms shall be constructed so that the finished concrete shall be of the form and dimensions shown on the plans and true to line and grade, and sufficiently rigid to resist deflection. Design of form work and removal of forms and shores are to conform to ACI 381. The responsibility for their adequacy shall rest with the contractor.

2. All forms shall be mortar tight and designed and constructed so that they may be removed without injuring the concrete.

3. If, at any stage of the work, during or after placing the concrete, the forms sag or bulge to such an extent as to allow concrete to fall below the elevation shown on the plans, or outside the true line of the form, the concrete affected shall be removed.

4. No concrete may be deposited against the earth as a side form.

B. Placing Steel Reinforcement

1. Reinforcing bars shall be accurately placed as shown on the plans and shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute, using concrete or metal chairs, spacers, metal hangers, supporting wires and other appropriate devices of sufficient strength to resist crushing under full load. Metal chairs which extend to the surface of the concrete (except where shown on the plans) and wooden supports, shall not be used.

2. Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.

3. Tack welding of reinforcing bars in place shall not be allowed.

4. Splicing:

a. Splices of bars shall be made only where shown on the Drawings or as approved by the Owner.

b. Where bars are spliced, they shall be lapped at least 30 diameters, unless otherwise shown on the plans.

c. Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.

5. Bending reinforcement:

a. Bends and hooks in bars shall be made in the manner prescribed in the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.

b. Bars shall not be bent or straightened in a manner which will injure the material.

c. Bars with kinks or unspecified bends shall not be used.

C. Placing Concrete

1. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.

a. The free fall of concrete from the end of the spout or chute, or from a transporting vehicle, shall not exceed 10 feet for thin walls (10 inches or less in thickness) nor more than 5 feet for other types of construction.

b. When the distance through which concrete must be dropped vertically exceeds the maximums specified above, a tremie or flexible metal spout shall be used. Flexible metal spouts having sufficient strength to hold the weight of the concrete shall be composed of conical sections not more than 3 feet long, with the diameter of the outlet and taper of the various sections such that the concrete will fill the outlet and be retarded in its flow.

c. Chutes, troughs, or pipes used as aids in placing concrete shall be arranged and used so that the ingredients of the concrete will not be separated. Chutes and troughs shall be of metal or metal-lined. When steep slopes are necessary, the chutes shall be equipped with baffle boards or a reversed section at the outlet. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in the forms; or the ends of such chutes shall terminate in vertical downspouts.

2. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump.

3. On arrival at the job site, adding water to the mix shall not be allowed.

4. Place concrete at such a rate that concrete is at all times plastic and flows readily between bare bars.

5. When placing is once started, carry it on as a continuous operation until placement of the section is complete.

6. Do not pour a greater area at one time than can be properly finished without checking; this is particularly important during hot or dry weather.

7. Thoroughly consolidate by suitable means during placement, working it around all embedded fixtures and into corners of forms.

8. No water shall be added to the concrete surface behind the screed. Addition of water to the concrete surface shall be cause for shutting down the placement operations and rejection of any suspect work.

9. Do not use re-tempered concrete that has been contaminated by foreign materials.

10. Struts, stays, and braces serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached the elevation rendering their service unnecessary. These temporary members shall be entirely removed from the forms.

11. Unless necessary materials and equipment are readily available to adequately protect the concrete in place, placing operations may be postponed by the Engineer when, in his opinion, impending conditions may result in rainfall or low temperatures which will impair the quality of the finished work. The Contractor shall pay for all delay related costs resulting from such postponements including costs for removing and replacing damaged concrete. In case rainfall should occur after placing operations are started, provide ample covering to protect the work.

12. Whenever it is necessary to continue the mixing, placing, and finishing of concrete after daylight hours, the site of the work shall be adequately lighted so that all operations are plainly visible. Every effort shall be made to enable finishing to be done in daylight.

13. Except by specific written authorization from the Architect/Engineer, concreting operations shall not be continued when a descending air temperature, in the shade and away from artificial heat, falls below 40°F, nor shall operations be resumed until ascending air temperature reaches 35°F. However, such authorization shall in no way relieve the Contractor of responsibility for proper results. Any concrete injured by frost action shall be removed and replaced at the Contractor's expense. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor's own expense.

14. The concrete shall be distributed to such depth and width that the plan thickness and grade will be obtained for the entire width of the pass. The spread concrete shall be vibrated, screened, and tamped by mechanical means. No manual screening or tamping will be allowed, except in those cases where the use of a

mechanical tamper and screener would be obviously impracticable. Any delay in excess of fifteen minutes in vibrating, screening and tamping shall constitute cause for shutting down the operation until the difficulties are corrected.

15. Discharge of mixed concrete from hauling equipment and processing by the initial power lay down machine or power screed shall be accomplished within sixty minutes after introduction of the mixing water to the cement and aggregates.

16. The concrete shall be deposited in such a manner as to require as little re-handling as possible. It shall be thoroughly vibrated against and along the faces of the forms. Necessary hand spreading shall be done with shovels, not with rakes. Workmen shall not be allowed to walk in the newly placed concrete with boots coated with earth.

D. Sidewalk and Curb and Gutter Joints

1. Locate joints as specified herein or as required on the plans.

2. Make all joints perpendicular and straight.

3. Joints for concrete structures that were removed or damaged as a result of construction under this contract shall match joints in the remaining original structure.

4. Expansion Joints

a. Sidewalk: Expansion joints one-half inch in thickness shall be constructed every 40-50 feet by using premolded expansion joint material. Also, expansion joints shall be placed where the new sidewalk meets existing sidewalks, fixed objects and where it meets the curb at all handicap ramps. No dowel bars shall be required at the joints.

b. Curb & gutter: Expansion joints, one-half inch in thickness, shall be constructed every 40-50 feet and at changes in direction by using premolded expansion joint filler. For both formed and slip-formed curb and gutter, joint filler shall also be placed between the curb and/or gutter and storm drainage structures.

c. Joint sealant will be installed over all expansion joints. Provide bond breaker and install per manufacturer specifications.

5. Contraction Joints

a. Sidewalk: Contraction joints shall be constructed at intervals equal to the width of the walk by cutting into the fresh concrete to a minimum depth of 1/4 of the thickness of the concrete to create a plane of weakness. The edges of tooled joints shall be rounded to provide a neat, workmanlike appearance.

b. Curb: Contraction joints shall be constructed every ten feet as shown on the plans by using steel templates not less than one-eighth inch nor more than three-sixteenth inch in thickness. The templates shall be removed as soon as the concrete has set sufficiently to hold its shape. Where curbs and curb and gutter are placed by slipform methods, the contraction joints every ten feet may be provided by cutting into the fresh concrete to a minimum depth of 1-1 /2 inches to create a plane of weakness. The edges of such joints shall be rounded to provide a neat workmanlike appearance.

6. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be cut neatly and removed.

E. Pavement Joints

1. Pavement joints will be designated as longitudinal and transverse construction joints, expansion joints, and contraction joints. The joints shall be constructed as shown on the drawings and in accordance with these specifications. Contraction joints shall be uniformly spaced between slab edges, construction joints and expansion joints and the maximum spacing between any joints (contraction, construction and expansion) shall be 12-feet. Submit joint layout plan for review and approval in accordance with Article 1.04 B.

2. The faces of all joints shall be at a right angle to the top surface of the pavement. Longitudinal joints shall be parallel to lanes of construction. Construction joints are those made by placing fresh concrete against previously cured concrete at planned locations. Forms for transverse construction joints shall remain in place until paving operations are resumed on the other side of the joint and until concrete has received sufficient strength to prevent damage caused by removing forms.

3. Construction Joints

a. Longitudinal and transverse construction joints shall be constructed with a female keyway constructed as shown on the project drawings. A galvanized metal or wood strip shaped to the keyway dimensions shall be used to form the keyway and maintain the required shape.

b. The strip shall be placed by a method that will not cause edge slump in excess of 1/8-inch in 10-feet when measured both longitudinally and transversely. The strip shall be located such that the surface of the slab above the keyway shall have as thick of section as possible in order to avoid chipping and breaking of the concrete surface at the joint prior to pouring adjacent slab. Contractor shall be responsible for repairing chipped slab as required.

c. Transverse construction joints are necessary where paving operations are suspended for 30 minutes or more.

d. Tie bars shall be used to tie only the first joint from the pavement edge. No other tie bars are required.

4. Contraction joints shall be made with suitable power driven saws or by using inserts. If saws are used, the Contractor shall have a minimum of two working power saws and one standby power saw on the project when concrete operations are underway.

5. Transverse contraction joints shall extend continuously across the full width of the concrete and shall be made as soon as the pavement can be sawed without raveling. All joints shall be sawed before uncontrolled shrinkage cracking takes place. If necessary, the sawing operations shall be carried on during both the day and night regardless of weather conditions. Tearing and raveling of the concrete during sawing shall be avoided. All joints shall be sawed within 24 hours after placing pavement. Suitable lighting shall be provided when sawing is performed after daylight hours.

6. During cool weather, the sawing of the joints may be delayed only for the time required to prevent tearing and raveling of the concrete during sawing.

7. Volunteer cracks that occur in the pavement shall be routed out with a power router to a 1-1/4 inch depth by 3/8 inch width, cleaned and filled with approved joint filler at the Contractor's expense.

8. Concrete shall not be placed in adjacent passes before all contraction joints are sawed. In all cases, joints shall coincide with those in adjacent passes to provide a continuous straight joint across the entire pavement width.

9. No sawing shall be done where volunteer cracks occur. If a volunteer crack falls within 5-feet of the location of a proposed saw joint, the sawed joint shall be omitted.

10. All sawed joints shall be filled with joint sealant before reopening to traffic. Prior to sealing, the joints shall be cleaned of all loose debris, cement powder, etc., in accordance with the manufacturer's recommendations. The joints shall be kept clean and allowed to dry before filling.

11. Extreme care shall be taken to fill the joints evenly to a height just below the pavement surface. Overfilling, or underfilling by more than 1/16-inch, shall be cause for shutdown of operations.

F. Finishing

1. The surface of the concrete shall be finished smooth and true to grade by float. The finishing shall commence immediately after the concrete is placed and shall progress at a rate equal to the progress of the paving operation. Any delay in excess of thirty minutes in performing the preliminary finishing shall constitute cause for shutting down the mixing operations until the finishing is resumed.

2. Hand methods of strike-off and consolidation will only be permitted when the width of pavement to be constructed is less than 10 feet or at rounded intersections where the use of machine finishing is impracticable.

3. While the concrete is still plastic, the entire slab surface will be tested by the Contractor for trueness with an accurate 10 foot straightedge. Any depressions that are found shall be immediately filled with freshly mixed concrete, struck-off, consolidated and refinished. High spots shall also be struck-off and refinished.

4. In advance of the curing operations the pavement shall be textured by brooming. Initial brooming operation shall permit Owner to review texture and recommend modifications, if any.

5. Finished Surface:

   a. The finished surface shall be true to grade and cross section, free from ruts, humps, depression or other irregularities. The surface shall not deviate from line and grade by more than 1/8 inch, plus or minus, in 10 feet. The determination of compliance with smoothness may be made with a straightedge or string line at the option of the Engineer. Any irregularities that may be found shall be corrected at the expense of the Contractor by means of a suitable grinding and grooving tool.

   b. The grinding tool shall consist of a machine equipped with cutting wheels mounted on a horizontal shaft. The grinding action shall be conducted parallel to the centerline. Grinding operations shall be deferred, as directed by the Engineer, whenever tearing of aggregate with the surface occurs and shall not be resumed until the concrete has hardened sufficiently to avoid tearing.

   c. The finished surface across contact joints shall not deviate from a straight line by more than 1/8 inch (vertically) in 12 inches when tested with a straightedge. The Contractor shall take the necessary precautions to prevent slumping of the edge of the concrete at contact joints.

   d. Line and grade control: The Contractor shall establish references at reasonable intervals, usually at subgrade elevation, for line and grade control of the placing operations. The Contractor shall furnish, place, and maintain such supports, wire devices, and materials as may be required to provide continuous line and grade reference controls to the placing machine, trimmers or paver.

   e. At least one ACI certified concrete finisher to be on crew at all times.

3.04 PROTECTION

A. The Contractor shall protect the concrete against all damage and markings. Barricades shall be placed at the proper locations to prevent traffic from using the pavement.

B. When it is necessary to provide for traffic crossing the concrete, the Contractor shall, at his expense, construct suitable substantial crossings to bridge over the concrete satisfactory to the Engineer.

C. Newly placed concrete shall be protected from damage by rain, snow and hail. Placing operations shall be stopped when rain is threatening, as determined by the Owner. The Contractor shall have available on the project enough material to cover the plastic concrete to prevent damage by rain, snow or hail. Any concrete damage due to rain, snow or hail shall be removed, by the Contractor at his expense.

D. No traffic or Contractor's hauling equipment will be permitted on the concrete until the concrete has case joints shall be sealed and trimmed as previously specified before traffic is allowed to use the pavement.

E. Curing

1. Protect the concrete from the effects of weather in accordance with HOT WEATHER CONCRETING AND COLD WEATHER CONCRETING in this section.

2. Water for curing shall be as specified in PART 2 - PRODUCTS.

3. Other curing requirements may be required in individual Specifications Sections.

4. Membrane curing compound method:

a. Surface of newly placed or exposed concrete shall be kept moist or wet until the curing compound is applied. The curing compound shall be applied immediately after all patching or surface finishing has been completed.

b. The curing compound shall be delivered to the work in ready-mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.

c. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100°F, unless otherwise specified by manufacturer's recommendations.

d. The curing compound shall be applied to the exposed surface at a uniform rate of 1 gallon per 100 square feet of area, unless otherwise required by manufacturer's recommendations.

e. In the event that the application of curing compound is delayed, the application of water as provided in this section shall be started immediately and shall be continued until application of the compound is resumed or started.

3.05 TESTING

A. Testing will be provided by an independent testing laboratory employed by the Owner. Refer to individual Specifications Sections for other Field Quality Control requirements.

B. Concrete sampled from a concrete pump shall be sampled from the hose after all of the priming grout has been wasted. The end of the hose shall be placed in a horizontal position before the concrete is discharged into the sampling pan. The concrete shall not be allowed to fall into the sampling pan.

C. The Contractor, at his expense, shall furnish the concrete required for testing.

D. Strength, slump and air tests shall be taken in accordance with the following unless otherwise specified in individual Specifications Sections:

1. Strength, slump and air tests may be taken in accordance with the placement rate per day as shown below:

Rate/day (C.Y.)	Compress. Air	Slump	Strength
0-8	1	1	Optional
8-20	1	1	1
For each 20 C.Y. or fraction thereof	1	1	1

2. Compressive strength test specimens shall be made and cured in accordance with ASTM C31 -Standard Practice for Making and Curing Concrete Test Specimens in the Field; Specimens shall be tested in accordance with ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

   a. Three specimens shall be prepared for each test, and these shall be broken at 7 and at 28 days, with one held in reserve.

   b. At least one test (3 specimens) shall be made for each class of concrete or each poured during one day.

3. If an air test does not meet the specification, a second air test shall be made immediately upon the same load. The concrete shall be accepted if the second air test meets the specification or rejected and removed from the project if the second air test does not meet the specification.

4. Slump and air tests shall be made in accordance with ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete and C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method, respectively.

5. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80'F and sixty minutes for temperatures above 80'F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.

6. If a compressive strength test is below the required specified strength, the Engineer shall immediately notify the Contractor or his authorized representative.

7. All costs incurred in resampling and retesting shall be paid by the Contractor if the retested strength is below the specified strength, and shall be assumed by the Owner if the retested strength is above the specified strength.

3.06 CLEANING

A. Contractor shall remove all forms, excess materials, debris and other items upon completion of concrete sitework.

B. All damage to concrete sitework prior to Owner's acceptance shall be repaired or replaced to Owner's satisfaction at the expense of the Contractor.

END OF SECTION

SECTION 02590

RESTORATION OF EXISTING IMPROVEMENTS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor shall provide all materials, labor, equipment, transportation, and other items required to restore existing improvements dislocated, damaged, or removed as indicated or as required to accomplish Work of other sections of these specifications. All restoration Work shall be in accordance with applicable regulations and as specified herein.

B. Restoration of existing improvements includes, but is not limited to the following:

1. General Restoration Requirements.

2. Restoration or replacement of gravel, asphaltic concrete, or portland cement concrete pavements, including base course and striping.

3. Portland cement concrete curbs, gutters, sidewalks, and driveways.

4. Landscaping improvements.

5. Miscellaneous improvements.

6. Irrigation / Sprinkler systems.

1.02 RELATED WORK

A. Section 02220 - Excavating, Backfilling and Compaction

1. Compaction requirements under paving and landscaping areas, removal of unsuitable materials.

B. Section 02513 – Portland Cement Concrete Pavement

1. Requirements for concrete curb and gutters, sidewalks, and driveways.

1.03 REFERENCES

A. The applicable provisions of the latest editions of the References listed below shall govern the Work covered under this Section, unless there is a conflict between said References and the requirements of this Section. In the case of such a conflict, the requirements of this Section shall apply.

B. State of Utah Standard Specifications for Road and Bridge Construction, latest edition including all addendums.

C. American Society for Testing and Materials (ASTM)

D. American Association of State Highway and Transportation Officials (AASHTO)

E. American Concrete Institute (ACI)

F. Concrete Reinforcing Steel Institute (CRSI)

1.04 SUBMITTALS

A. Submit shop drawings, manufacturer's literature, certifications, and other product data in accordance with other sections and as specified herein.

B. Required submittals include, but are not limited to:

1. Manufacturer's recommended transportation, unloading, and storage requirements as well as installation guides and instructions for materials provided as part of this work.

2. Evidence of materials conformance with applicable requirements and these specifications.

3. Dimensional information for pipes, valves, fittings, castings, structures and other items provided as part of this Work.

4. Design of replacement and extension of irrigation sprinkler systems.

C. Contractor shall maintain accurate construction record drawings for items restored as part of this Work, but covered by subsequent landscaping, paving or as a result of Work of other sections of these specifications. These records shall be submitted to Engineer for approval prior to application for final payment.

1.05 QUALITY ASSURANCE

A. Transportation, handling, storage and installation practices shall be in accordance with manufacturer's recommended practice for materials provided as part of this Work.

B. Use adequate numbers of skilled workmen who are trained and experienced in the type of construction required.

C. The quality of the finished restored improvement, as determined by the Owner, shall be of equal or better quality than was said improvement prior to being damaged or removed.

1.06 DELIVERY, STORAGE AND HANDLING

A. Contractor shall be responsible for proper transportation, unloading, handling, storage, and security of all equipment and materials to be provided as part of this specification in accordance with manufacturer's recommendations.

B. Materials shall be stored in such a manner as to prevent damage or degradation. Any materials damaged prior to installation shall be removed from the project and replaced with new materials at no additional cost. Lost or stolen materials shall be replaced at no additional cost.

1.07 PROJECT CONDITIONS

A. Review site conditions prior to construction to identify any areas that will require restoration and to assess items that will need advance approval from Owner or Engineer.

1.08 MEASUREMENT AND PAYMENT

A. No measurement shall be made of this work. Restoration of Existing Improvements will be paid as a part of the Lump Sum Bids. Such Price shall constitute full compensation for furnishing and placing of materials required to complete the Restoration of Existing Improvements, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.

1.09 WARRANTY

A. All work done shall have a 2-year guaranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers providing materials or equipment as part of this specification shall have a minimum of five (5) years experience in the design, manufacture, testing and support of such materials.

B. Manufacturers shall provide, upon request, verification of a consistent record of meeting or exceeding materials or performance standards as specified herein.

2.02 MATERIALS - GENERAL

A. Materials shall be as required to complete the restoration of existing improvements, and shall be at least equal to original improvement at the time of damage or removal, as determined by the owner of said improvement, and shall match original construction in finish and dimension.

B. Materials shall be in accordance with requirements of local jurisdiction having authority. Obtain approval of all materials from local jurisdiction having authority prior to ordering.

2.03 UNTREATED BASE COURSE

A. Shall conform to the requirements of section 02230 - Base Course.

2.04 SUBGRADE STABILIZING MATERIAL

A. See Section 02230 - Base Course.

2.05 STABILIZING FABRIC

A. Separation Fabric: Non-woven geotextile, specifically manufactured for use as a separation/stabilization geotextile; made from polypropylene, and with the following

minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 200 lbf; ASTM D 4632

2. Tear Strength: 75 lbf; ASTM D 4533

3. Puncture Resistance: 110 lbf; ASTM D 4833

4. Water Flow Rate: 40 gpm per sq. ft.; ASTM D 4491

5. Apparent Opening Size: No. 40; ASTM D 4751

2.06 BITUMINOUS PAVING MATERIALS

A. See section 02511 - Asphaltic Concrete Paving.

2.07 PORTLAND CEMENT CONCRETE

A. Portland cement concrete for curbs, gutters, sidewalks and driveways shall conform to the requirements of Section 02513 – Portland Cement Concrete Paving.

2.08 SOD AND VEGETATION

A. All materials shall be from sources approved by the Owner; however, such approval does not relieve the Contractor from responsibilities for growth, maintenance and replacement specified herein.

B. Topsoil:

1. Topsoil for backfill mixture for tree pits shall be fertile, friable, natural loam, surface soil, reasonably free of clay lumps, brush, weeds, and other litter, and free of rocks, stumps, stones larger than 2" in any dimension, and other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from naturally well-drained sites where topsoil occurs in a depth of not less than 4".

2. Do not obtain from bogs or marshes.

C. Manure:

1. Well-dried, rotted, unleached, pulverized cattle manure reasonably free from refuse and harmful materials.

D. Mulch:

1. Fine grind bark mulch.

E. Tree staking and guying:

1. Steel T-post stakes 8 feet long and steel ground stakes 18 inches long.

2. All T-post stakes shall be primed and painted a dark green color.

3. Provide wire ties and guys of 2-strand, twisted, pliable, galvanized iron wire not lighter than 12-gauge.

4. Provide new 2-ply garden hose not less than 5/8-inch diameter in size, cut to required lengths to protect tree trunks from damage by wires.

F. Sod:

1. Strongly rooted blend of Kentucky Blue Grass sod, not less than 2 years old and free of weeds and undesirable native grasses.

2. Provide only sod capable of growth and development when planted (viable, not dormant).

3. Recommended Kentucky Blue Grass mixture is: 50% Baron, 25% Glade and 25% Touchdown, or approved equal.

G. Commercial fertilizer:

1. Agriform 20-10-5 21-gram fertilizer tablets for trees and shrubs. Provide three tablets per tree.

2. Ammonium sulfate fertilizer in pellet form for lawn areas at 40 actual pounds of nitrogen per acre.

H. Trees:

1. Trees shall be not less than indicated sizes, balled and burlapped or container grown, unless otherwise indicated, specified or required by Owner of tree removed.

I. Shrubs:

1. Shall be as removed, minimum 5 gallon can.

2.09 IRRIGATION SPRINKLER SYSTEM

A. Contractor shall guarantee all materials and workmanship to be free from defects for one year from the date of substantial completion.

B. All valves, heads, quick couplers, controllers, and other fixtures shall be of the same make and model as similar existing equipment, unless such model has been discontinued or as otherwise approved by Engineer.

C. Pipe

1. Sprinkling pipe shall be new, Polyvinyl Chloride (PVC) plastic pipe, extruded from virgin parent material.

2. Pipe shall be homogenous throughout, and free of cracks, holes, foreign materials, blisters, wrinkles, and dents.

3. Pipe shall conform to National Sanitation Foundation (NSF) drinking water standards, and shall be marked with the manufacturer's name, size, schedule, type of pipe, and working pressure.

4. Main line pipe shall be schedule 40 ring-tite pipe.

5. Sprinkler lateral pipes 4-inch diameter and smaller shall be PVC 1120/1220, Type I, Grade 2, Schedule 40.

D. Fittings and connections shall be molded fittings of the same size and material as pipe being connected, suitable for solvent weld. Plastic saddle and flange fittings are not acceptable.

E. Drain valves shall be installed on all main lines. Drain valves shall 3/4" brass full turn ball cocks tested for 150 psi pressure.

F. Valve wiring shall be direct burial cable, of sizes appropriate for the distance and installation, and shall be type "UF" 600 volt stranded or solid copper, single conductor wire with PVC insulation, and bear UL approval.

G. Valve boxes shall be prefabricated, with adequate room for the number of valves and fittings being installed, including adequate room for maintenance. Boxes shall meet ASTM D-638 with lock down lids.

H. Thrust blocks shall be provided for main lines.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that Work covered under other sections of these specifications is complete to the point that Work covered under this section may properly commence without hindering or damaging Work of other trades. Do not proceed with construction until unsatisfactory conditions have been corrected.

B. Verify that Work performed under other sections of these specifications has been adequately inspected, tested and accepted prior to covering up that Work as part of the Work specified under this section.

C. Carefully examine restoration areas, verifying dimensions, materials and other restoration requirements with Engineer and Owner prior to beginning Work covered under this section.

3.02 METHODS AND PROCEDURES

A. General Requirements

1. Contractor shall obtain all permits necessary for the restoration of existing surface improvements.

2. Contractor shall protect all public and private property adjacent to the work. Exercise due caution to avoid damage to such property.

3. All improvements damaged or removed shall be restored in accordance with local jurisdiction having authority. In case of conflict between these specifications and local authority specifications, the local authority shall govern.

4. Repair or replace all existing surface improvements, which were damaged or removed as a result of operations of Work under this contract. Restoration shall be of at least equal quality and identical in dimension to original improvement unless specifically specified otherwise.

3.03 INSTALLATION

A. Gravel Surfaced Areas

1. Where trenches are excavated through gravel-surfaced areas such as roads and driveways and other areas, the gravel surface shall be restored by placing road base material upon a prepared subgrade.

2. Subgrade preparation shall conform to Paragraphs 221.3 and 225.3 of the State of Utah Standard Specifications for Road and Bridge Construction:

a. Average of field density determinations shall be 95% of the maximum dry density, with no determination lower than 92%.

b. The maximum dry densities shall be determined in accordance with the following:

i. A-1 Soils: AASHTO Designation T-180, Method D.

ii. All other Soils: AASHTO Designation T-99, Method D.

3. Thickness of road base surface shall be 6 inches or shall match existing, whichever is greater.

4. Compaction of road base surface shall conform to Paragraph 301.3 of the State of Utah Standard Specifications for Road and Bridge Construction.

B. Asphaltic Concrete Surfaced Areas

1. Where trenches are excavated through asphaltic concrete surfaced areas such as roads, driveways or parking areas, the surface shall be restored by preparing the subgrade, placing base course(s), placing tack and prime coats, and placing the asphaltic concrete surface course(s).

2. Subgrade preparation shall conform to applicable parts of Paragraphs 221.3 and 225.3 of the State of Utah Standard Specifications for Road and Bridge Construction:

a. Average of field density determinations shall be 95% of the maximum dry density, with no determination lower than 92%.

b. The maximum dry densities shall be determined in accordance with the following:

i. A-1 Soils: AASHTO Designation T-180, Method D.

ii. All other Soils: AASHTO Designation T-99, Method D.

3. Thickness of base course shall be 6 inches, shall match existing, or shall be as required by local authority having jurisdiction, whichever is greater.

4. Placing and compaction of base course shall conform to applicable parts of Section 301 of the State of Utah Standard Specifications for Road and Bridge Construction, excluding pay factor allowances.

5. Tack Coat

a. Tack coat shall be applied at the rate of 0.05 to 0.15 gal/SY. A hand sprayer or brush shall be used to apply tack coat to vertical faces of previously constructed bituminous pavement (over ½ hour hence) prior to placing an adjacent or parallel pass, curbs, gutters, slab edges, and all structures to be in actual contact with the bituminous pavement. Tack coat shall also be applied uniformly at the same rate to the horizontal top surface of each lift of bituminous pavement prior to placing the next lift of bituminous pavement to promote a bond between the two courses of pavement. None of the material shall penetrate into the pavement and for this reason the application should be limited.

b. Prior to applying the material, the surface to be treated shall be swept or flushed free of dust or other foreign material.

c. Protect all surfaces not required to receive tack coat from any inadvertent application.

d. The temperature range of the tack coat at the time of application shall be such that the viscosity will be between 50 and 100 centistokes as determined in accordance with ASTM Designation D-2170.

e. Under no circumstances shall traffic be permitted to travel over the tacked surface. If detours cannot be provided, restrict operation to a width that will permit at least one-way traffic over the remaining portion of the roadbed. If one-way traffic is provided, the traffic shall be controlled in accordance with governing authority.

f. After application of tack coat, sufficient time shall be given to allow for complete separation of asphalt and water before paving operations begin. The tack coat shall be applied on only as many surfaces as will be paved against in the same day.

6. Mixing, placing, spreading and compaction of bituminous surface course shall conform to applicable parts of Section 402 of the State of Utah Standard Specifications for Road and Bridge Construction, excluding pay factor allowances.

C. Concrete Curbs, Gutter, Sidewalks and Driveways

1. Shall be removed and replaced to the next joint or scoring lining beyond the actually damaged or broken sections; or in the event that joints or scoring lines do not exist or are three or more feet from the removed or damaged section, the damaged portions shall be removed by saw cutting full-depth.

2. All new concrete shall match, as nearly as possible, the appearance of adjacent concrete improvements. Where necessary, lampblack or other pigments shall be added to the new concrete to obtain the desired results.

3. Concrete forms shall be true to line and of sufficient strength to ensure against bulging or displacement.

4. Contraction and expansion joints shall match original construction in placement and size, unless otherwise required by local jurisdiction having authority.

5. Reinforcement shall be replaced as in original construction, unless otherwise required by local jurisdiction having authority, and shall be installed in accordance with applicable CRSI and ACI Standards.

6. Finishing and curing shall be in accordance with local jurisdiction having authority.

D Vegetated Areas

1. Prior to placing sod or other final vegetative cover, examine and repair the subgrade as necessary to assure a smooth and even surface which will match grade and contours of surrounding undisturbed ground. Finish grade construction areas to match grade prior to construction activities. Assure that a positive slope away from all building walls is maintained for at least 10 feet to prevent runoff from approaching walls.

2. Prepare soil under areas to receive vegetation by placing topsoil to a depth equal to surrounding conditions or to 6", whichever is greater. Disk or till 3 cubic yards manure per 1000 square feet of surface area to a depth of 8 inches.

3. Roll and rake areas receiving vegetation to smooth, even surface, free of ridges, with loose, uniformly fine texture.

4. Allow for final vegetation thickness when preparing subgrade.

5. Restore raked areas to specified condition if eroded or otherwise disturbed after fine grading and prior to placing vegetative cover.

6. Remove stones over 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.

7. Limit preparation to areas which will be planted promptly after preparation.

8. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before sodding. Do not create a muddy soil condition.

E. Trees and shrubs:

1. Layout individual tree locations.

2. Secure approval of Engineer and Owner prior to planting.

3. Excavate tree and shrub pits with vertical sides. Dispose of subsoil removed from landscape excavations. Do not mix with backfill. If tree or shrub is to be planted on excavation area, remove all impervious fill from tree and shrub pit down to pervious material.

4. Place three Agriform fertilizer tablets evenly around the perimeter of, and immediately adjacent to the root ball at a depth which is between the middle and the bottom of the root ball.

5. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

6. Stake or guy trees immediately after planting. Stakes and guys should be evenly distributed around tree. All stakes must be driven so as not to disturb the root ball.

F. Sprinkling Systems:

1. Restore all sprinkling systems disturbed, removed, or damaged by construction operations in a condition at least equal to that prior to construction, and expand sprinkling system into areas of new planting.

   a. Slope all pipes to drain.

   b. Install pipe, valves, fittings, heads, and other fixtures per manufacturer's recommendations.

   c. Install drain sumps around main line drain valves.

   d. Connect new valves to system controller. Coordinate with facilities maintenance personnel.

G. Sodding:

1. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass.

2. Secure sod on slopes with U-shaped wire clips as required to prevent slippage. Immediately after planting, sod shall be thoroughly watered with a fine spray. Watering shall occur as frequently as needed to keep sod constantly moist for a period of 14 days after planting. Two weeks after planting, apply ammonium sulfate in pellet form at 40 actual pounds of nitrogen per acre. Water thoroughly immediately after fertilizing.

H. Miscellaneous Restoration Items

1. All other improvements interrupted or removed to permit the construction specified herein shall be restored. Reuse materials if in good condition. Use new materials for any components, which are in poor condition or are damaged during construction or relocation. Use new materials for any culverts or buried utility piping. Miscellaneous improvements to be restored shall include, but shall not be limited to, the following:

   a. Culverts

   b. Fences

   c. Utilities, including water meters, boxes, valves, and service lines

   d. Mail boxes

   e. Pavement markings and directional signs

3.04 PROTECTION

A. Provide barricades and restrict access as appropriate to prevent damage to Work in place.

B. Contractor shall be responsible for protection of Work in place against displacement, damage, loss or theft until Owner's acceptance. Any Work installed and subsequently damaged, lost or displaced shall be repaired or replaced to the Owner's satisfaction at no additional cost.

C. Planting Maintenance:

1. Begin maintenance immediately after planting, and continue until inspection and acceptance, in no case less than 30 days from the time of completion of Work.
2. Maintain trees by pruning, cultivation and weeding as required for healthy growth. Restore planting saucers.

3. Tighten and repair stake and guy supports and reset trees to proper grades or vertical position as required. Spray as required to keep trees free of insects and disease.
4. Maintain lawns for not less than 30 days and longer as required to establish an acceptable lawn. To be acceptable, lawn must be past second mowing with no bare spots. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

3.05 CLEANING

A. Thoroughly clean, rake, wash and/or flush all restoration Work prior to submitting for Owner's acceptance.

END OF SECTION